ANOTHER W[illegible] PRODUCTION NUMBER

Coal Age

AUGUST 1942

McGRAW-HILL PUBLISHING COMPANY, INC. • THIRTY-FIVE CENTS PER COPY

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Mined by Machine at Kenilworth

•

TOP-NOTCH FAN DRIVE
Includes Dual Motors and Controls

•

MODERN STEAM GENERATOR
Takes Over a Heavier Mine Load

•

RESULTS UP, COSTS DOWN
As Isabella Refines Preparation

•

7,000,000 TREES PLANTED
In Illinois Spoil Revitalization

•

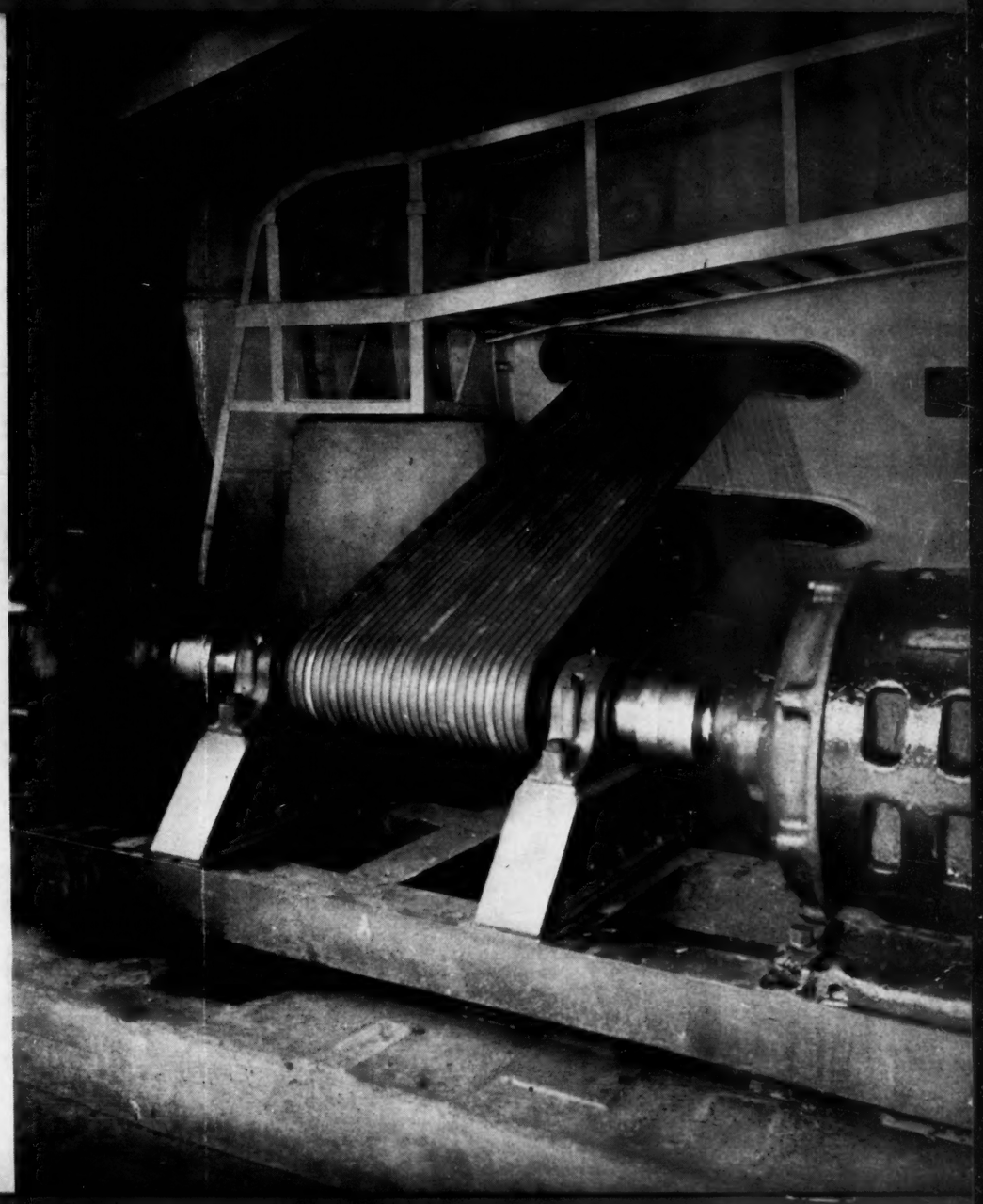
THE FOREMAN'S FORUM
And Exam Questions and Answers

•

KINKS FROM THE MINES—
Equipment and Maintenance Tips

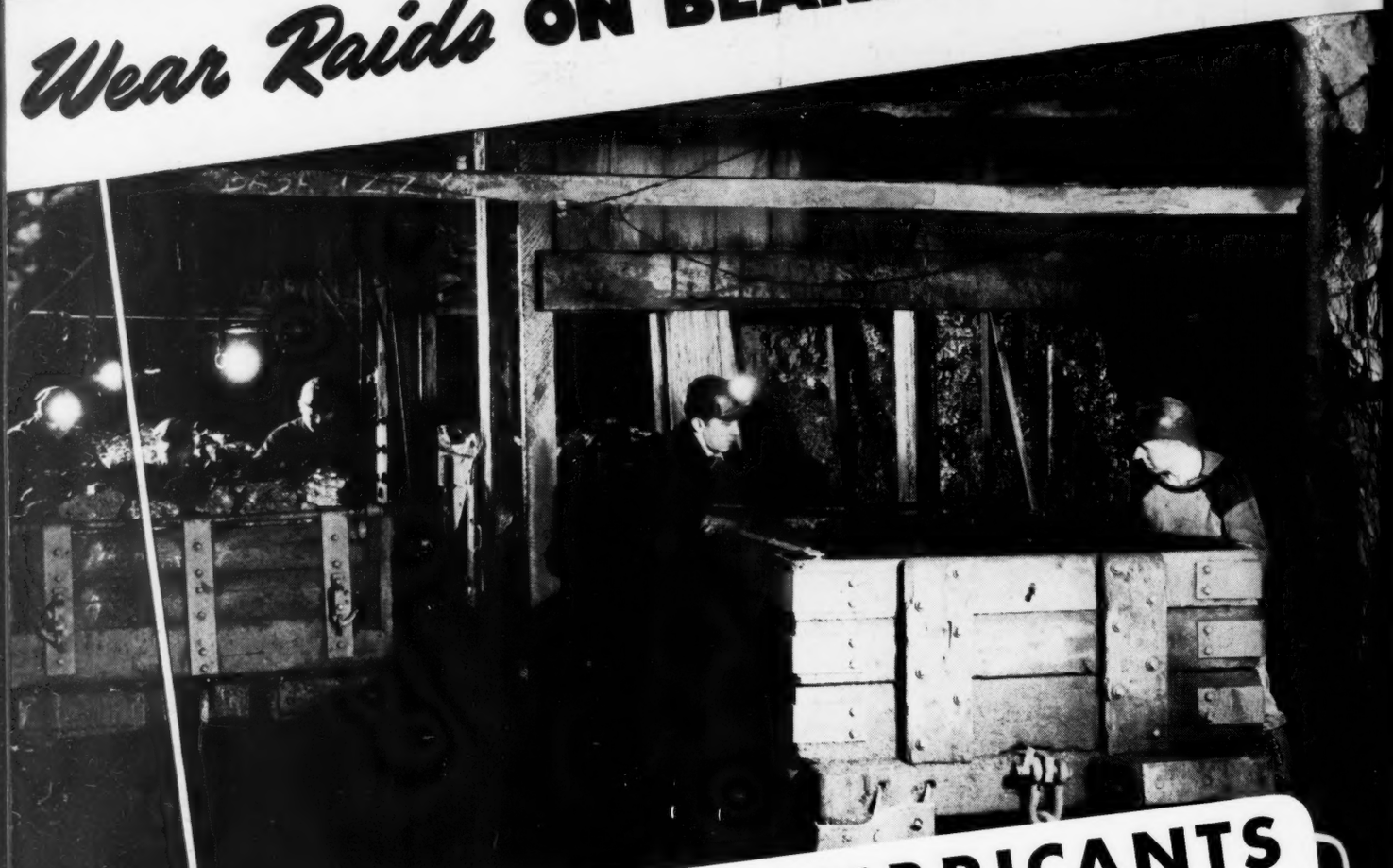
•

Complete Table of Contents, P. 5



[illegible] trouble-free operation at Peraglove No. 15

Wear Raids ON BEARINGS STOPPED



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stayed on the job twice as long . . . reduced wear

Vital to victory . . . that's what coal production is today! And in one of Pennsylvania's largest collieries faulty lubrication was putting a drag on production. Grease hardened after only 5 or 6 weeks' use . . . failed to reach the back of bearings, causing excessive wear . . . and men complained of cars being hard to push.

Then a Sun Oil Engineer — one of those capable Doctors of Industry — recommended Sun No. 300 Mine Car Grease. That solved the problem in double-quick time. No more wear raids . . . fewer bearing changes necessary . . . bearings always adequately lubricated when grease is applied only every 12 weeks . . . and cars are much easier to push.

Another contribution by Sun Engineers and Sun Mine Lubricants to the smashing victory America is winning on the production front.

In your mine let Sun's Doctors of Industry help you. They stand ready, willing and able to help step up production and keep it up. For helpful examples of what they can do, write for "Helping Industry Help America."

SUN OIL COMPANY • Philadelphia

Sun Oil Company, Ltd., Toronto

"LET'S GO! U.S.A." KEEP 'EM FLYING!

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include:
SUN Pressure Grease
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SUN Mine Car Lubricants
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SUN PETROLEUM PRODUCTS

HELPING INDUSTRY HELP AMER

Making a machine equal 1000 shovels

A typical example of B. F. Goodrich service in war time

"PICK UP AND DELIVERY" at five tons a minute — that's a job machines do where building materials are being made for war plants. A sand pile is unrolled, put on a conveyor and sent through a plant faster than 1000 swinging shovels could carry it. But these machines take rubber belts, and these belts can destroy themselves. For one of a dozen reasons they can start running crooked, as this one is doing, sliding over the sides of the pulleys and grinding off precious rubber that all the king's men with shovels couldn't put back.

Plant engineers are often too busy these days to trace the causes of these and other losses of rubber. But rubber must be saved if the machines are to go on running and saved without loss of working time.

B. F. Goodrich salesmen and distributors have less *selling* work to do just now, so they're using their knowledge of rubber to help their customers, especially those making war materials, find out how it can be saved. (Most B. F. Goodrich distributors also have field vulcanizers, which they're now using for repairing, splicing, salvaging worn belts.)

In addition, B. F. Goodrich engineers have written a series of seven small folders, "How to get the most service out of industrial rubber products." With their help almost any user of industrial rubber goods can save rubber. They're free on request. If you use conveyor belts, ask also for the B. F. Goodrich "Belt Maintenance Manual" (catalog section 2800). Address *The B. F. Goodrich Co., Industrial Products Division, Dept. D2, Akron, Ohio.*

B.F. Goodrich

FIRST IN RUBBER

AS RIGHT AS ★ ★ ★ ★

WHAT are we fighting for? One objective is the preservation of The Bill of Rights. The Bill is *not* a jumble of vague generalities. It is a set of ten specific commitments by the government—to the American people. Hulburt, too, has committed itself to a specific responsibility—the lubrication of Coal Mine Equipment. Hulburt Quality Grease is the only grease made exclusively for Coal Mining Equipment.

HULBURT OIL & GREASE COMPANY

Specialists in Coal Mine Lubrication

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THE BILL OF RIGHTS

Article One: *Religious Establishment Prohibited, Freedom of Speech, of the Press, and Right to Petition.* Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press; or the right of the people peaceably to assemble and to petition the Government for a redress of grievances.

Article Two: *Right to Keep and Bear Arms.* A well-regulated militia being necessary to the security of a free State, the right of the people to keep and bear arms shall not be infringed.

Article Three: *Billeting of Soldiers.* No soldier shall, in time of peace, be quartered in any house without the consent of the owner, nor in time of war but in a manner to be prescribed by law.

Article Four: *Unreasonable Search and Seizure Prohibited.* The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated; and no warrants shall issue but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

Article Five: *Rights of Citizens Accused of Crime.* No person shall be held to answer for a capital or other infamous crime unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the militia, when in actual service, in time of war or public danger; nor shall any person be subject for the same offense to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation.

Article Six: *Prompt Trial by Neighborhood Jury in Criminal Cases.* In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which districts shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defense.

Article Seven: *Trial by Jury in Civil Cases.* In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury shall be otherwise re-examined in any court of the United States than according to the rules of the common law.

Article Eight: *Excessive and Cruel Punishments Prohibited.* Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

Article Nine: *Retention of Rights by the People.* The enumeration in the Constitution of certain rights shall not be construed to deny or disparage others retained by the people.

Article Ten: *Rights of States under Constitution.* The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

★ *Let us send you one or more copies of The Bill of Rights, printed in three colors on special stock, suitable for framing. Please use your letterhead and specify quantity — for your customers, employees, and friends.*

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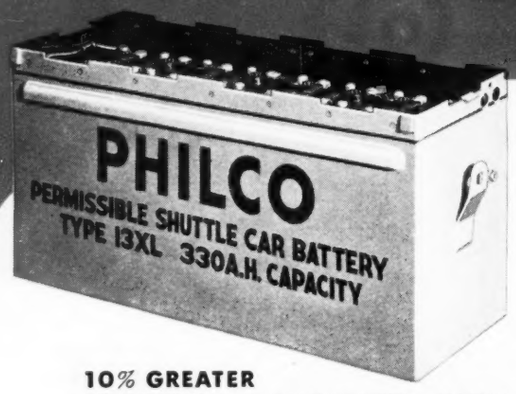
Haul 10% More Coal Between Charges—

WITH POWERFUL PHILCO XL STORAGE BATTERIES!



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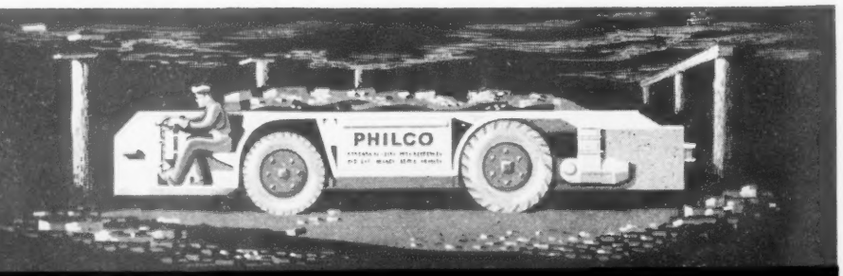
And because our production facilities have been *tripled* you can now get Philco batteries in half the time that is current practice in the industry! Specify Philco!

Just out! New catalog of Philco Shuttle Car and Mine Locomotive Batteries. Write for your copy today. Philco Storage Battery Division, Dept. C, Trenton, N. J.

PHILCO STORAGE BATTERIES—DEPENDABLE MOTIVE POWER FOR JOY SHUTTLE CARS AND MINE LOCOMOTIVES.



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AUGUST 1942 Thirty-Five Cents Per Copy

Coal Age

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Volume 47 No. 8

Coal's success in meeting war-time fuel demands can be credited in large part to past and continuing mechanization of loading. As experience is gained, the field of mechanization broadens. The Independent Coal & Coke Co., for example, finds mobile loaders and shaker conveyors very helpful in mining thick-coal pillars. Factors involved and methods are detailed starting on p. 51.

Loading its first car of coal on the day of Pearl Harbor, Esco No. 10 mine, in eastern Kentucky, is another operation exemplifying the possibilities of mechanical operation, both in mining and preparation. How mobile loaders and shuttle cars underground are supplemented by a combination wet-and-dry cleaning plant without shaker screens is the subject of an article scheduled for September.

Preparation methods and equipment never are static. A case in point is the Isabella (Pa.) plant of the Weirton Coal Co. How this organization got better results and cut cost by new crusher equipment and bin facilities to facilitate coal reclama-

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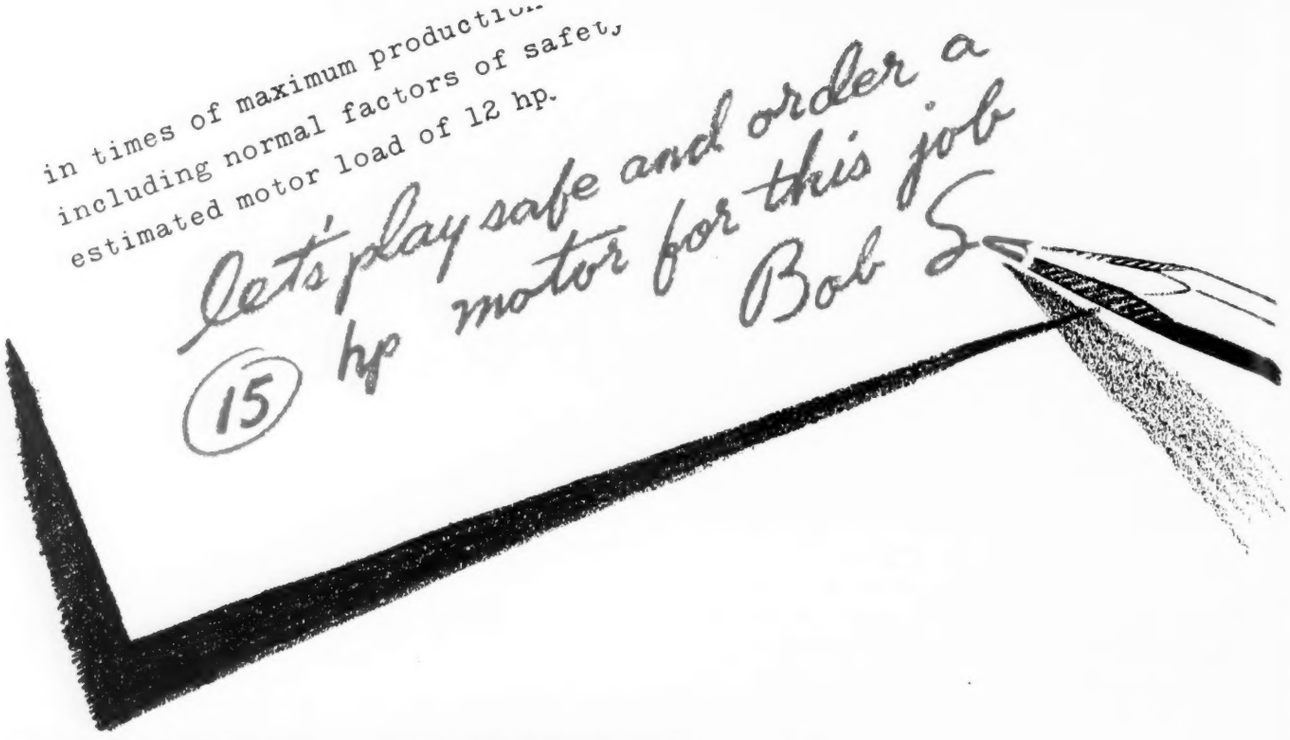
in times of maximum production
including normal factors of safety
estimated motor load of 12 hp.
let's play safe and order a
15 hp motor for this job
Bob S

GENERAL ELECTRIC asks:

"Will you help save 25% in critical materials by modifying your peacetime motor policy?"

IN PEACETIME, your engineers as well as our own have generally advocated motors having a generous capacity for the job. Such "overmotoring" was then justified as a safety factor to take care of unexpectedly heavy loads, and as a means of extending motor life to 20 years, say, instead of 10.

But today, every pound of steel, copper or aluminum tied up by the use of motors needlessly large for the job is one less pound to help beat the Axis. You can help save these materials by selecting motors strictly on the basis of the ***actual expected*** load, without additional safety factors. If in doubt, do not select arbitrarily the "next larger rating." Often, the "next smaller rating" will handle the job satisfactorily.

Because of better design modern motors are considerably lighter than those of a few years ago, but they are just as ***conservatively rated.*** This means that a margin of safety to meet reasonable overloads has already been "figured in" by the manufacturer. When another safety margin is allowed by the buyer, needless overcapacity is the result.

Why not check with your engineers to see if your motor specifications can be modified in the cause of conservation? You'll be helping to get more motors into war production, and make more metals available for winning the war. General Electric Company, Schenectady, N. Y.

The Navy "E", for Excellence, has been awarded to 92,780 General Electric employees in five plants manufacturing naval equipment.

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LET'S MAKE EVERY MAN-HOUR OF WAR EFFORT PRODUCE MAXIMUM RESULTS

(CONTINUED FROM PAGE 5)

tion, added variable drives and meters to improve metallurgical washing, installed rubber coverings on filter disks for better dewatering and made other improvements is recited in this issue (p. 62).

Maintenance looms larger and larger in coal-mining affairs as demand rises and materials and equipment get tighter. To keep its equipment in the job, Castle Gate No. 2 mine, in Utah, has increased its shop facilities, revised a number of repair methods, carefully scheduled lubrication and inspection and set up a system of keeping up with overhauls and repairs. An analysis of Castle Gate work is scheduled for September.

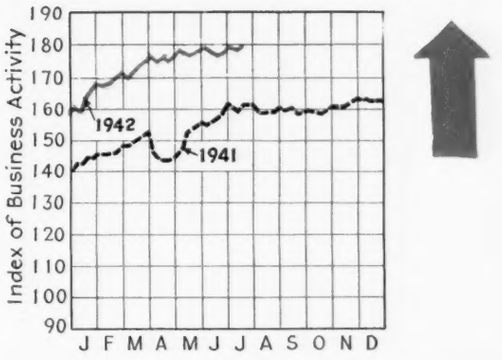
Mine water must be handled and so the objective should be: "Handle it as cheaply as possible." The Pursglove Coal Mining Co., operating in northern West Virginia, tackled a dewatering problem by installing a 40-hp. deepwell turbine pump to displace six underground units powered by motors totalling 285 hp. A mile of 4-in. pipe and large savings in maintenance and labor were other results. A concise report will appear soon.

Rounding out this issue are articles on the modern steam generator with automatic controls which took over a larger load from a number of return-tubular boilers at Centralia, in Illinois (p. 59), and a description of an all-out fan drive for Pursglove 15 mine, which includes dual motors and controls (p. 56); also operating, maintenance and equipment tips (pp. 73-84) and news (pp. 45 and 87).

HOW'S BUSINESS

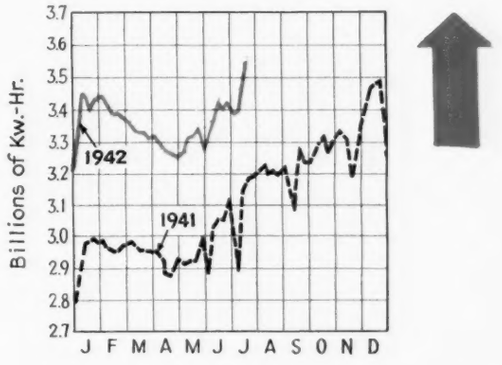
GENERAL BUSINESS CONDITIONS

The framework of price control has been preserved, says *Business Week*, with Congress voting to keep OPA in operation, as well as beating off farm bloc attempts to lift OPA control over foods, and the National War Labor Board paring the wage boost to Little Steel workers to 44c. a day. War material supply is tight, however, and maldistributed — foreshadowing increased production control. *Business Week* Index was at 183.3 as of July 18, as against 181.5 a month earlier and 161.4 a year ago.



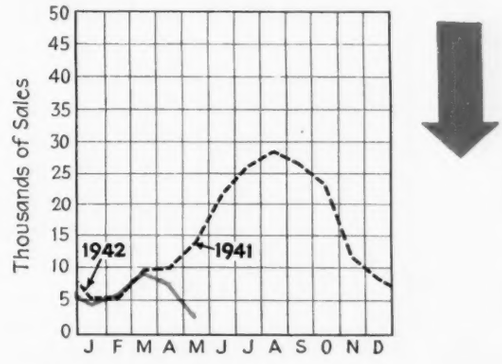
ELECTRIC POWER OUTPUT

Output of electric energy by the electric light and power industry during the week ended July 18, according to the Edison Electric Institute, continued the recovery registered in the preceding week, after a slight recession during the week ended July 4. The figure for the latest week, 3,565,367,000 kw.-hr., compares with 3,428,916,000 in the preceding week and is 11.4 percent over that of the corresponding week in 1941. Figures for other recent weeks are: June 20, 3,434,000,000; June 27, 3,457,000,000; July 4, 3,424,000,000 kw.-hr.



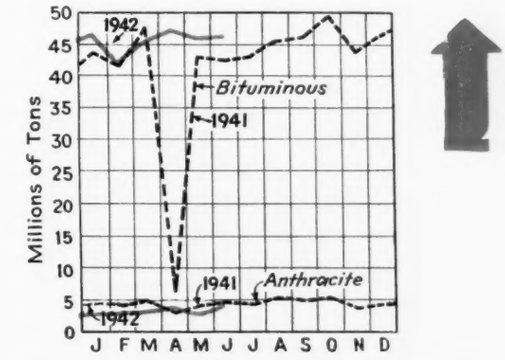
COAL STOKER SALES

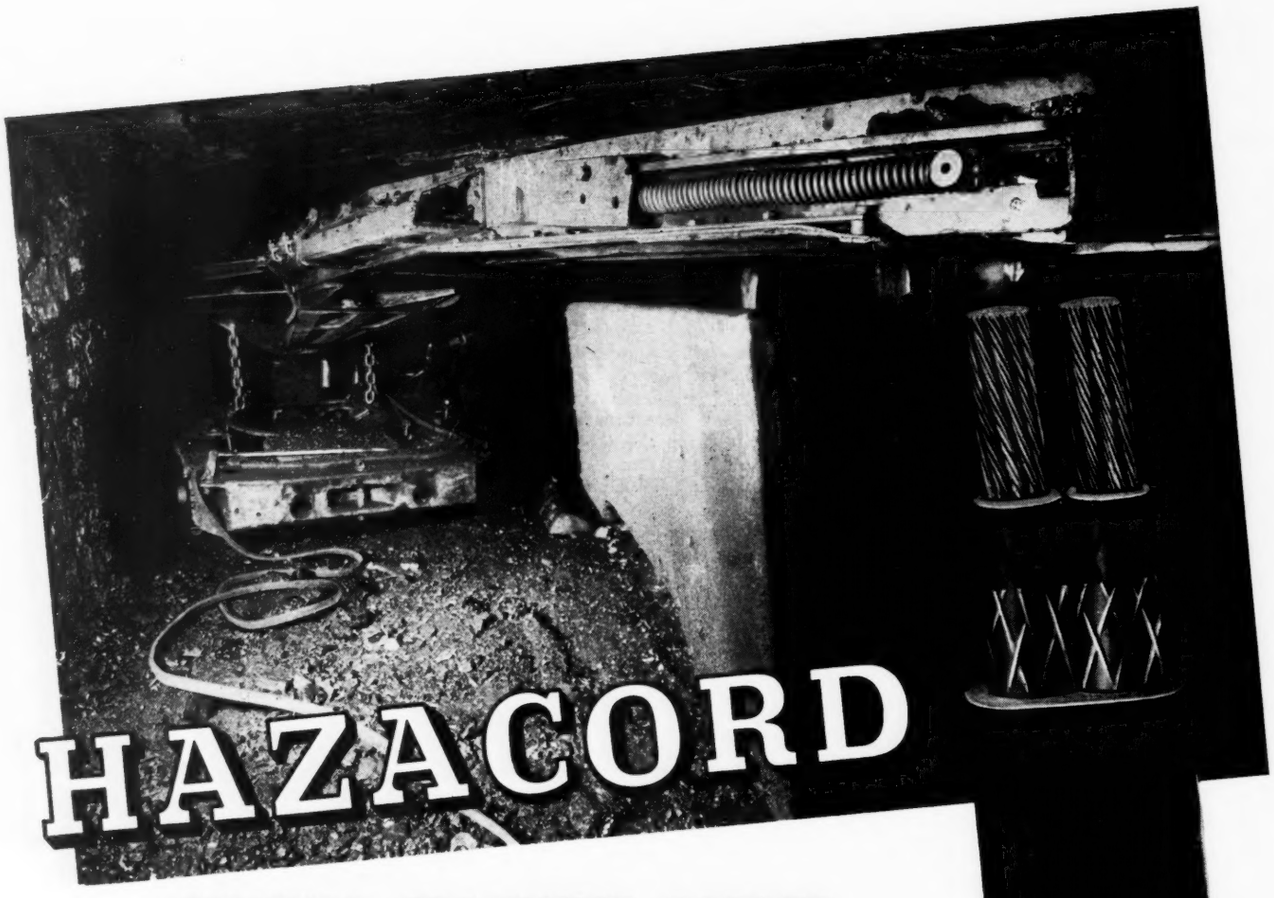
Mechanical stoker sales in the United States in May last totaled 5,053 units (U. S. Bureau of the Census from 101 manufacturers), compared with 9,989 in the preceding month and 14,389 in May, 1941. Sales of small units in May last were: Class 1 (under 61 lb. of coal per hour), 4,473 (bituminous, 3,698; anthracite, 775); Class 2 (61-100 lb. per hour), 122 (bituminous, 115; anthracite, 7); Class 3 (101-300 lb. per hour), 127.



COAL PRODUCTION

Bituminous coal produced by United States mines in June last (preliminary) totaled 48,410,000 net tons, according to the Bituminous Coal Division, U. S. Department of the Interior. This compared with 48,250,000 tons in the preceding month and 43,319,000 tons in June, 1941. Anthracite tonnage in June last, according to the U. S. Bureau of Mines (preliminary), was 5,133,000, as against 4,843,000 (revised) in the preceding month and 5,072,000 tons in June, 1941.





MINING MACHINE CABLES MOLD CURED FOR TOUGHNESS

Extra Flexible:

The conductors are of fine soft, tinned copper wires, rope stranded for flexibility.

Well Insulated:

The rubber on each conductor is resilient and strong. There is an extra thickness of insulation in which the reinforcing seine twine mesh is embedded.

Hazacord Can Take it:

The protective jacket really protects. It is a smooth armor of very tough rubber, vulcanized under heavy pressure in a thick lead mold.

By Bureau of Mines tests and by its behavior in mine service, Hazacord Twin Mining Machine Cable is good.

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MINING CABLES

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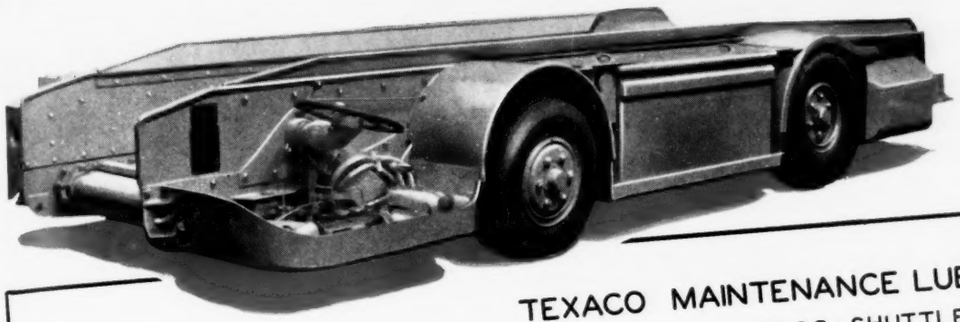
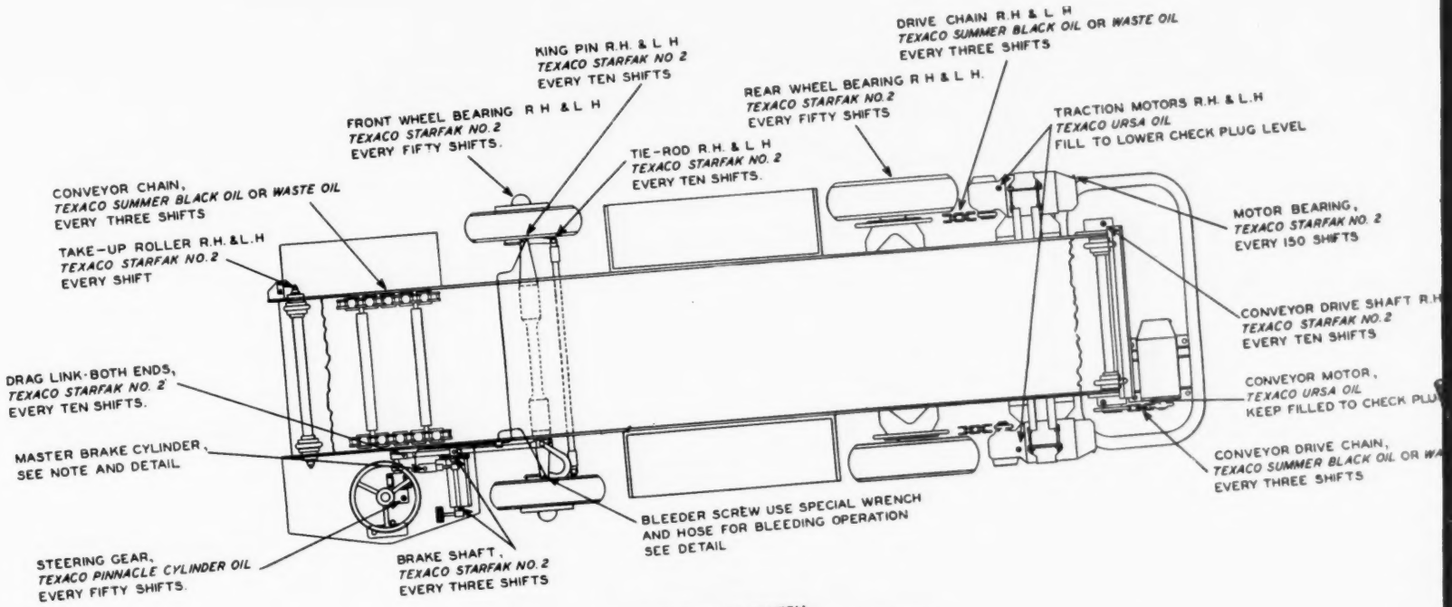
Prevent Brea



Where, When and W

TEXACO MAINTENANCE LUBRICATION CHART

JOY 32 - SHUTTLE CAR



NOTE HYDRAULIC BRAKE SYSTEM

DRAINING - REMOVE SMALL BOLT IN THE END OF THE BLEEDER SCREW ON INNER FACE OF BRAKE ASSEMBLY, THEN INSERT RUBBER BLEEDER DRAIN AND LOOSEN BLEEDER SCREW PROPER ONE FULL TURN TO DRAIN DEPRESS PEDAL SLOWLY THEN PERMIT IT TO SLOWLY RETURN TO ITS OFF POSITION REPEAT THIS UNTIL AIR BUBBLES COME OUT OF THE BLEEDER DRAIN

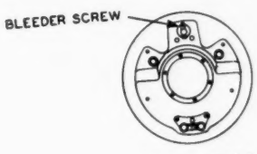
FLUSHING - USE CLEAN DENATURED ALCOHOL ONLY FILL MASTER CYLINDER. DEPRESS PEDAL UNTIL ALL ALCOHOL IS DRAINED FROM LINES.

REFILLING - BLEEDING - KEEP MASTER CYLINDER HALF FULL OF BRAKE FLUID, OTHERWISE AIR WILL BE DRAWN INTO THE SYSTEM

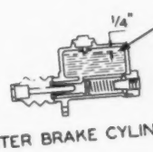
CAUTION - IF THERE IS AIR IN SYSTEM THE BRAKE PEDAL ACTION WILL BE SPONGY.

BE SURE TO TIGHTEN BLEEDER SCREW AND REPLACE DUST SCREW AFTER EACH LINE IS BLED AND REFILLED

USE GOOD GRADE OF AUTOMOTIVE HYDRAULIC BRAKE FLUID



BRAKE DRUM



MASTER BRAKE CYLINDER

CHARTS FOR UNDERGROUND MACHINERY ARE AVAILABLE

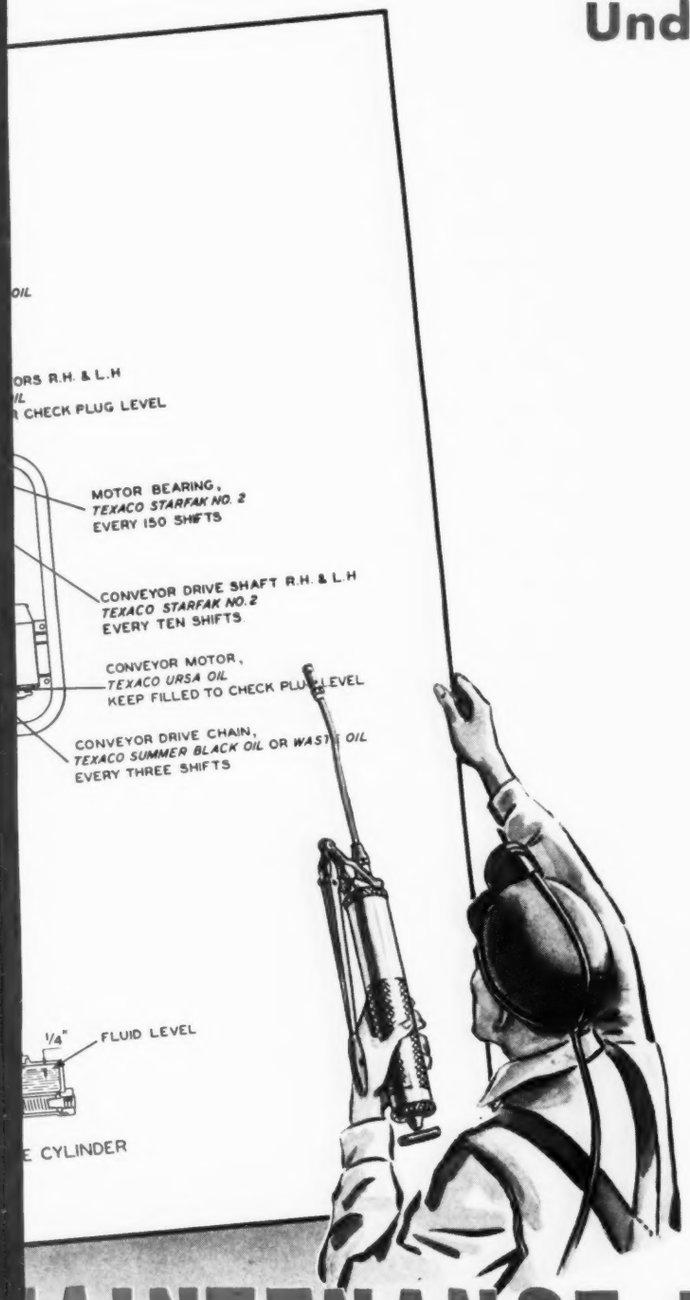
TEXACO MAINTE

FO

MAINTENANCE

reakdowns

hen and With What to Lubricate Your Specific Underground Equipment



To assure scientific lubrication in spite of a shortage of trained operators, Texaco Lubrication Charts show exactly how to service each lubrication point of specific makes and models of cutters, loaders, locomotives, and other underground machinery . . . and with products approved by the manufacturer.

Order full-sized (18″ x 12″) charts of your machines, tack them up at all lubricating stations, have them followed . . . and in this way assure less time out for repairs, maximum service life from expensive parts. As designs change, revised charts will be supplied.

In writing, be sure to give *makes* and *models* of your machines, addressing:

The Texas Company, National Sales Division, Dept. C, 135 East 42nd Street, New York, N. Y.

AINTENANCE LUBRICATION

FOR THE COAL MINING INDUSTRY

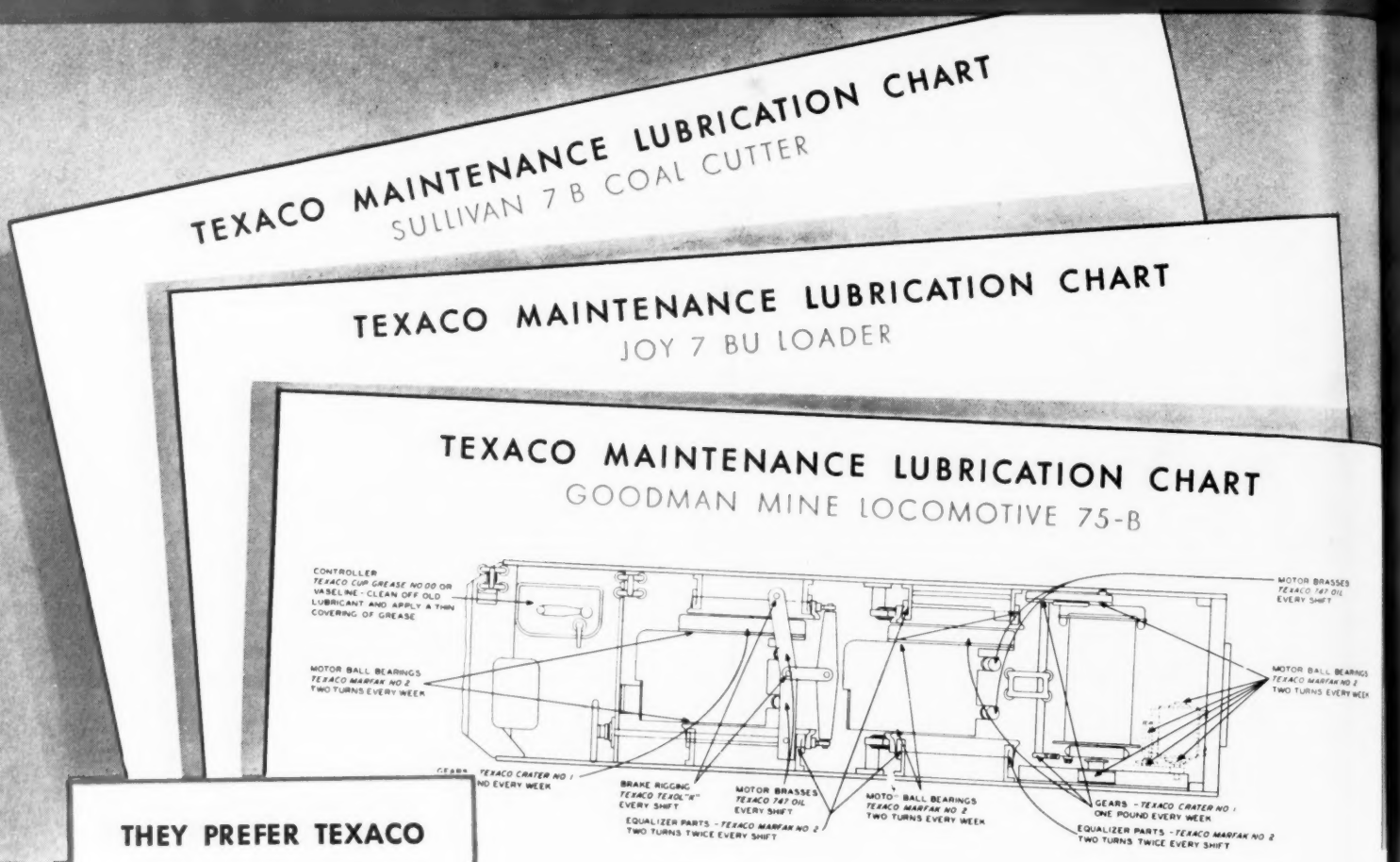
WAR-TIME PROGRAM FOR Top Tonnage!

You will get continuous operation from your mechanized equipment if it is properly lubricated.

On the inside of this 4-page insert is shown a typical maintenance lubrication chart, designed to help keep your equipment CONTINUOUSLY ON THE JOB for the biggest tonnage which the industry has ever been asked to produce.

⬅ SEE CHART INSIDE

TEXACO MAINTENANCE LUBRICATION CHARTS NOW AVAILABLE FOR UNDERGROUND COAL-MINING MACHINERY


TEXACO MAINTENANCE LUBRICATION CHART
SULLIVAN 7 B COAL CUTTER
TEXACO MAINTENANCE LUBRICATION CHART
JOY 7 BU LOADER
TEXACO MAINTENANCE LUBRICATION CHART
GOODMAN MINE LOCOMOTIVE 75-B
CONTROLLER
TEXACO CUP GREASE NO 00 OR VASELINE - CLEAN OFF OLD LUBRICANT AND APPLY A THIN COVERING OF GREASE
MOTOR BALL BEARINGS
TEXACO MARFAK NO 2
TWO TURNS EVERY WEEK
MOTOR BRASSES
TEXACO 747 OIL
EVERY SHIFT
MOTOR BALL BEARINGS
TEXACO MARFAK NO 2
TWO TURNS EVERY WEEK
GEARS - TEXACO CRATER NO 1
ONE POUND EVERY WEEK
BRAKE RIGGING
TEXACO TEXOL "K"
EVERY SHIFT
MOTOR BRASSES
TEXACO 747 OIL
EVERY SHIFT
MOTO" BALL BEARINGS
TEXACO MARFAK NO 2
TWO TURNS EVERY WEEK
EQUALIZER PARTS - TEXACO MARFAK NO 2
TWO TURNS TWICE EVERY SHIFT
GEARS - TEXACO CRATER NO 1
ONE POUND EVERY WEEK
EQUALIZER PARTS - TEXACO MARFAK NO 2
TWO TURNS TWICE EVERY SHIFT

THEY PREFER TEXACO

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

Texaco Maintenance Lubrication Charts for underground machinery are available. Ask for them. In writing us, be sure to state make and model of your machines.

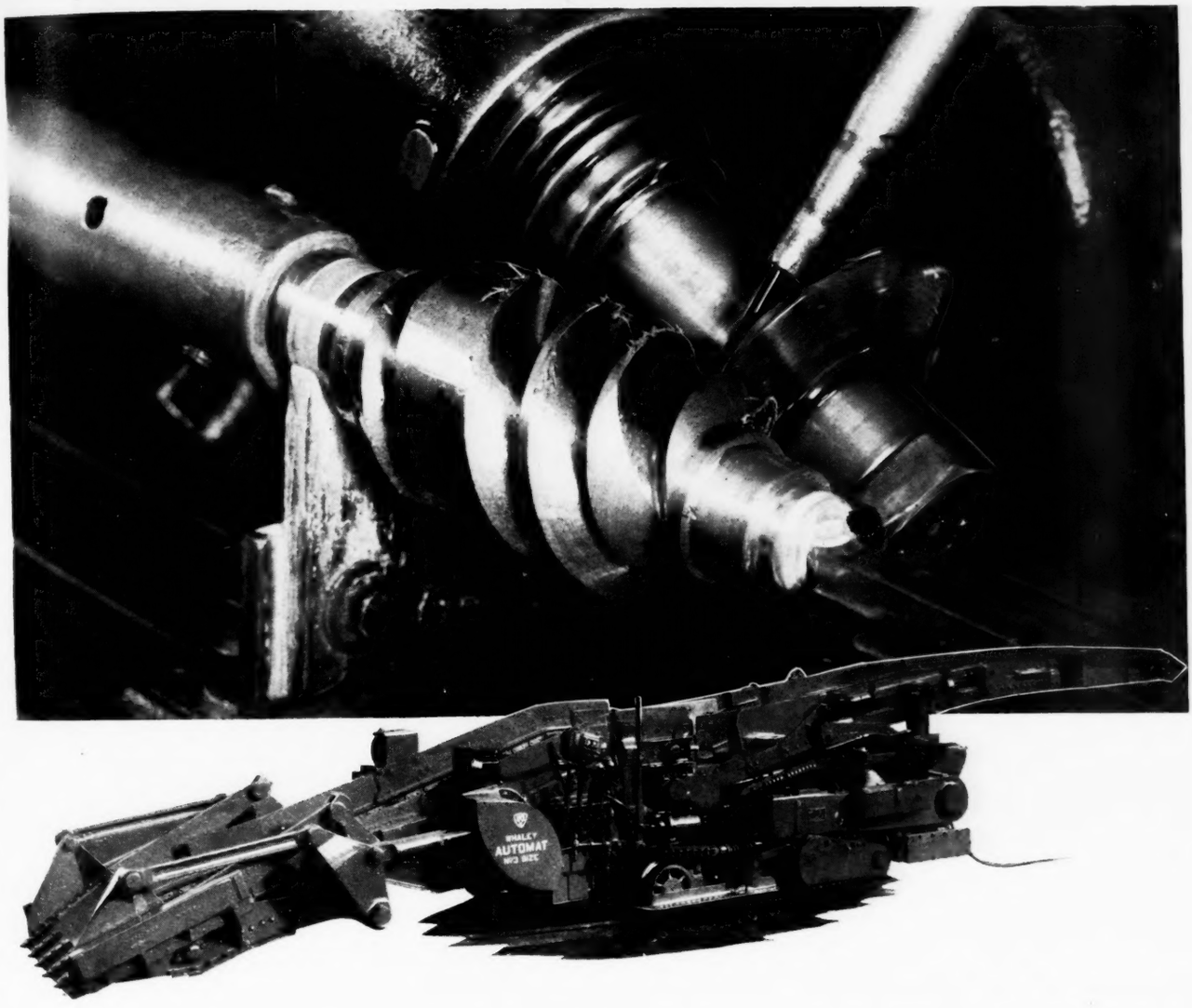
When you specify Texaco, you get products holding first place not only with many prominent coal mine operators, but also in the various fields listed in the panel.

Texaco Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States and in most cases deliveries are made by motor truck, thus avoiding freight and delay of shipments from distant points.

TEXACO
REG. T.M.

THE TEXAS COMPANY

Here's a Worm Gear —that Won't be Wormy!



This worm gear isn't an ordinary gear. It's made in our own plant under rigid control and when complete we know it will have the guts to take the punching necessary to meet the brutal performance requirements we set for the Whaley "Automat". This gear however, is only one among the hundreds of parts we build under the complete supervision of our engineers. Each part must meet the high standards of perfection set by us to assure dependable service of the Whaley "Automat" in your mine.

For over 35 years, we have designed and built heavy duty, automatic, loading machines exclusively, for underground service. The only firm in existence devoting its full energies to this job: The "Automat" is the only loader of its type available. Its shoveling action is the simplest, most effective and safest method known. Although it has a loading capacity of 7 tons a minute, only one 25 H. P. motor is required to operate it. This means maximum average capacity at an extremely low power consumption. Is it any wonder leading operators depend upon the "Automat" for maximum production at minimum cost?

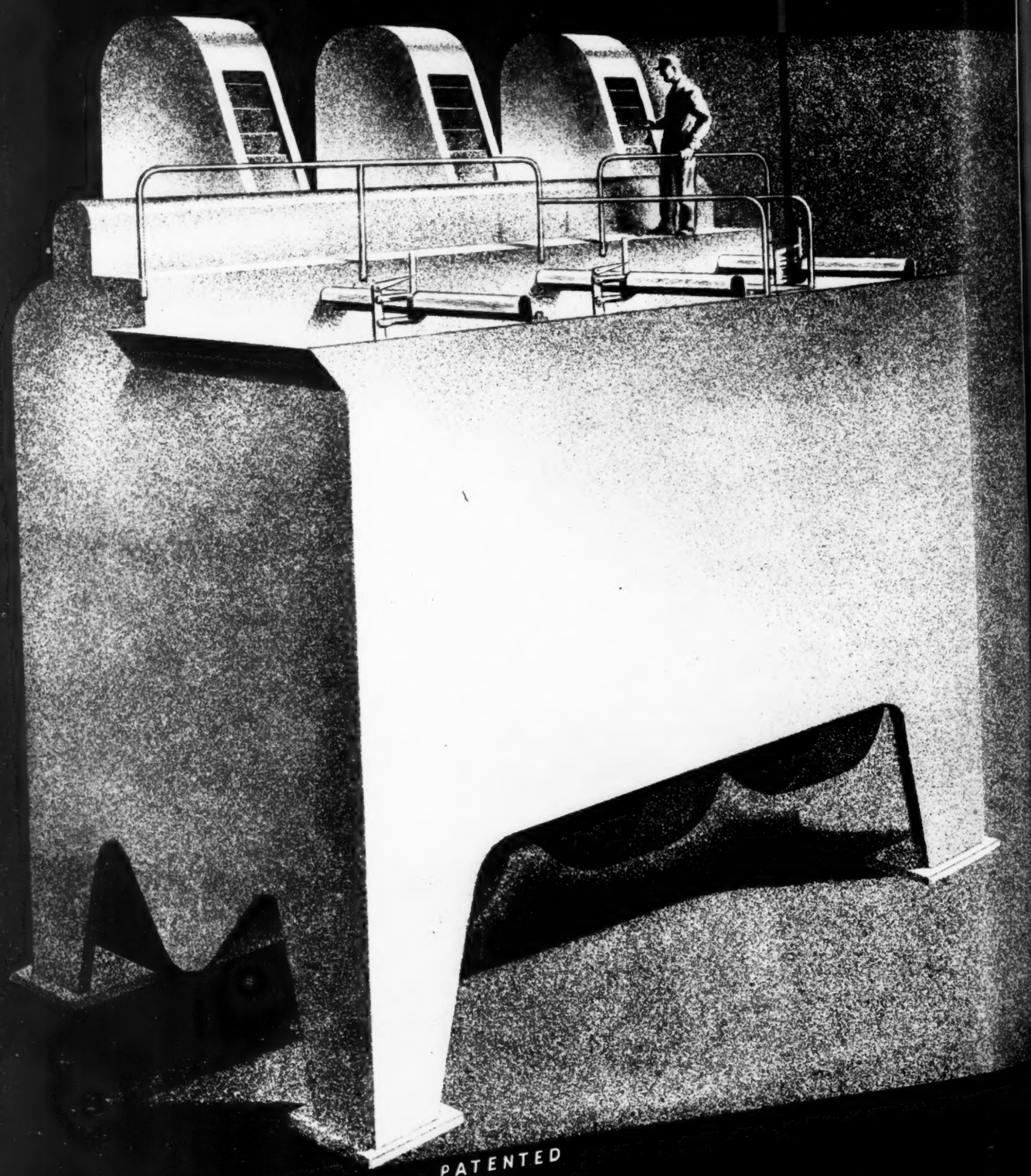
In design, construction and performance, you'll find the Whaley "Automat" to be tops in perfection. In each part, you'll find a reason for depending upon the "Automat" for uninterrupted service and economy.

Write to us for completely illustrated literature and details. Myers-Whaley Co., 182 Proctor, Knoxville, Tenn.

MYERS-WHALEY

"Mechanical Loaders Exclusively For Over 35 Years"

A GREAT DEVELOPMENT F



PATENTED

FOR METALLURGICAL COALS

For the past ten years Jeffrey has maintained a steady and increasing program of research and development on Jigs.

Today, with recent developments, Jeffrey has an outstanding jig for metallurgical coals.

JEFFREY JIGS for the "TOUGH" JOBS

New features and refinements have been added to our complete line of jigs . . . a size for every requirement.

THE JEFFREY MFG. CO.

COLUMBUS • OHIO

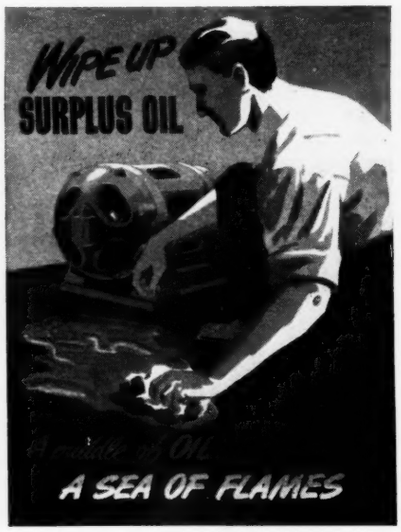
FIGHTING FIRES before they start

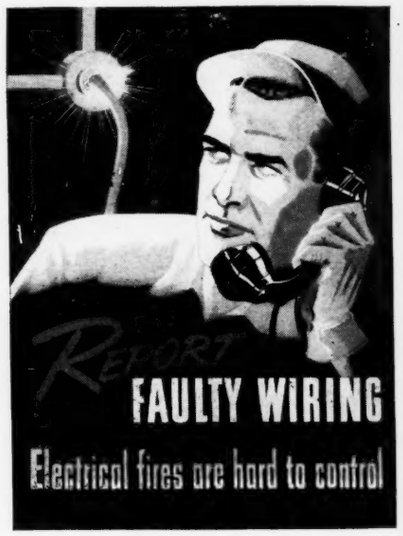
Most fires are preventable. A smoldering cigarette, flipped carelessly into a dark corner . . . a welder's spark flying unnoticed into a pile of oily waste—these little things can, and do, start devastating fires.

At the beginning of the war emergency, recognizing that fire is a treacherous and deadly saboteur of production, Bethlehem intensified its attack on the fire hazard. As always, trained, fully-equipped fire-fighting forces supplied the backbone of the fire-control effort, maintaining day-and-night vigilance in every Bethlehem plant and shipyard.

But to bring home the vital importance of fire prevention and control to every Bethlehem employee, we've designed a series of posters in full color and are displaying them in key locations throughout all Bethlehem shipyards and steel plants, which are now engaged in vital war work.

These posters are based on analysis of the most serious causes of fire and the all-important part of the human element in fire prevention. By pointing out to employees specific ways in which they can prevent or subdue fires, the posters are helping to minimize a potentially grave threat to the production of war materials.





Five of Bethlehem's series of fire-prevention posters. These posters are printed in full color. Each poster is designed to emphasize a specific problem in fire prevention or control.

BETHLEHEM STEEL

War-production plant executives who are carrying on fire-prevention campaigns may find these posters of interest. A complimentary set will be supplied on request to Bethlehem Steel Company, Bethlehem, Pa.

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

Will Help You PREVENT SHIPPING "BOTTLENECKS"

Makes Long-Time Storage Practical by Preserving Coal Structure

CARDOX-mined coal will not crumble when subjected to extensive mechanical handling. It is firm and remarkably free from shatter-cracks.

Mines and dealers can safely accumulate the reserve stock piles urged by the government because CARDOX-mined coal resists degradation during storage.

★

Write or wire today for practical proof of the advantages of CARDOX. A test demonstration involves no expense or obligation on your part.

● Because CARDOX-mined coal is not weakened by shatter-cracks it resists degradation during handling, shipping and storage. If dislodged by the gentle heaving action of CARDOX, even the most friable coal can be safely accumulated in stock piles at the point of consumption before rail congestion develops serious bottlenecks.

CARDOX also helps solve war-time production problems caused by shortages of labor and equipment. As CARDOX produces no smoke or noxious fumes, coal can be broken down just as fast as men or machines can load out the fall. By rolling out the coal for easy loading it reduces wear and tear on mechanical loaders...keeps available loaders productive more hours each shift.

Let us demonstrate, by a test in your own mine, how many of your war-time problems CARDOX solves.

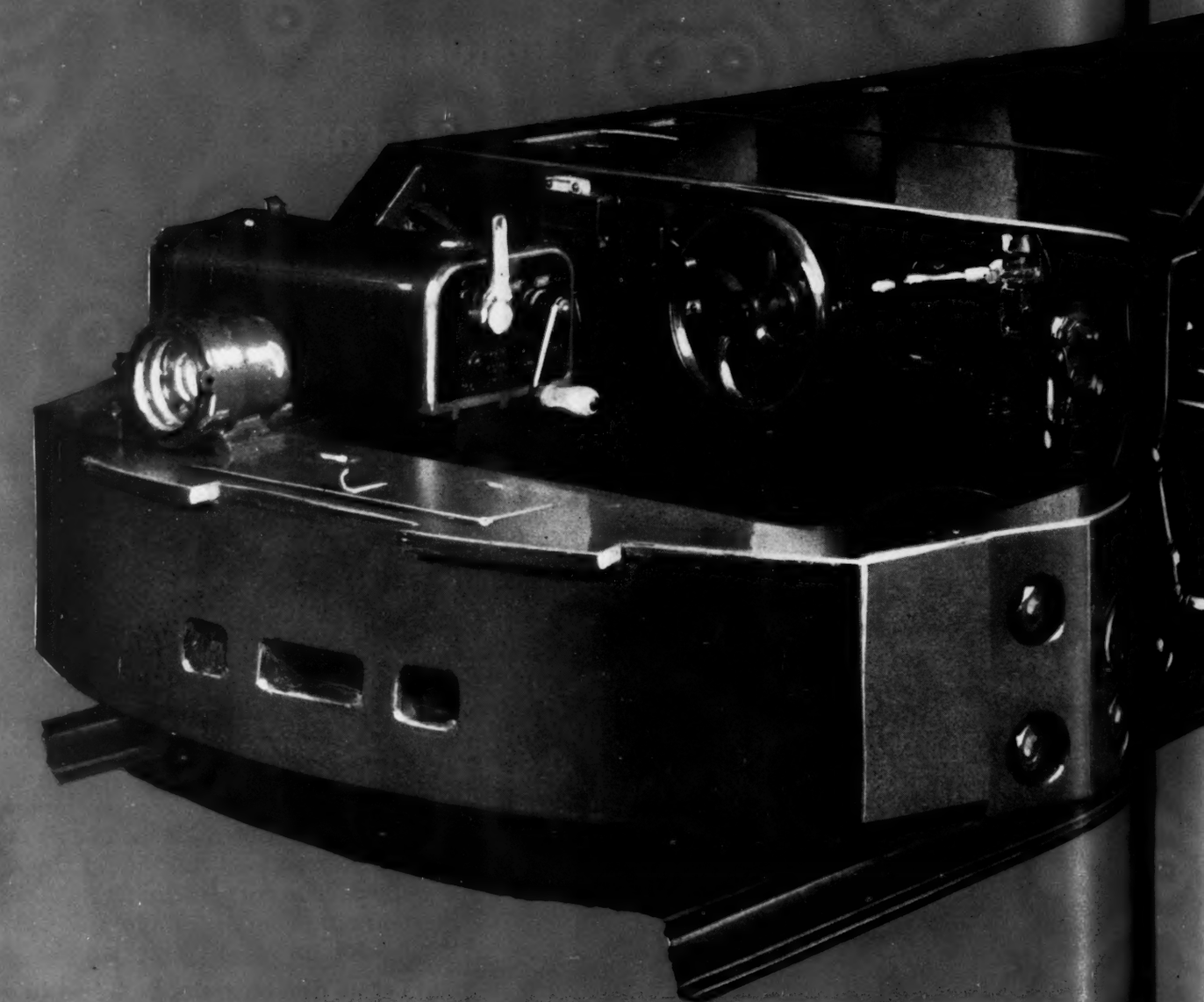
CARDOX CORPORATION

BELL BUILDING • CHICAGO, ILLINOIS

GOODMAN MINE L

Adequate motor ratings, heavy duty controls, rugged construction are standard characteristics of every Goodman locomotive. Special features to meet your particular mine requirements are also a regular part of our engineering service.

When analyzing your transportation system call in a Goodman engineer.



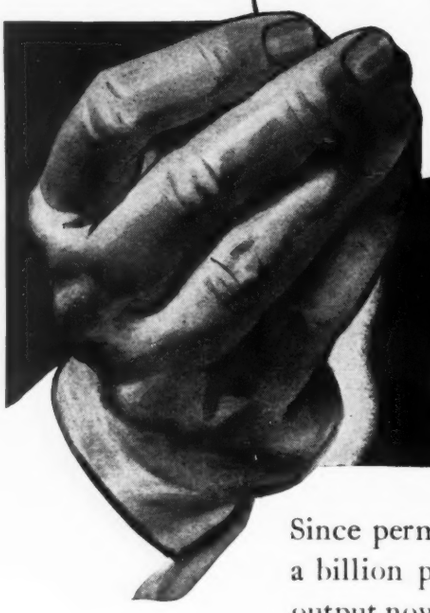
GOODMAN MANUFACTURING COMPANY

E LOCOMOTIVES

A 2-motor 15-ton low-vein Haulage Locomotive.

HALSTED STREET AT 48TH • CHICAGO, ILLINOIS

Safety Records Are Tremendously Important in War-time Production



Permissible Explosives' Safety Records are Significant

Since permissible explosives were introduced in 1909, more than a billion pounds have been used. About 70% of America's coal output now is produced with permissible explosives and, according to the Annual Report of the Explosives Division of the U. S. Bureau of Mines for 1941, "*when used in a permissible manner, Permissible Explosives have never been the cause of mine explosions . . .*"

A remarkable safety record — especially noteworthy today, when war requirements mean stepped-up production rates, with many new men in the mines. *Better blasting* is doubly important now. The outstanding record of permissible explosives points the way toward greater safety.

If you haven't received your copy of "9 Ways to Get the Most from Your Explosives," write for it today.

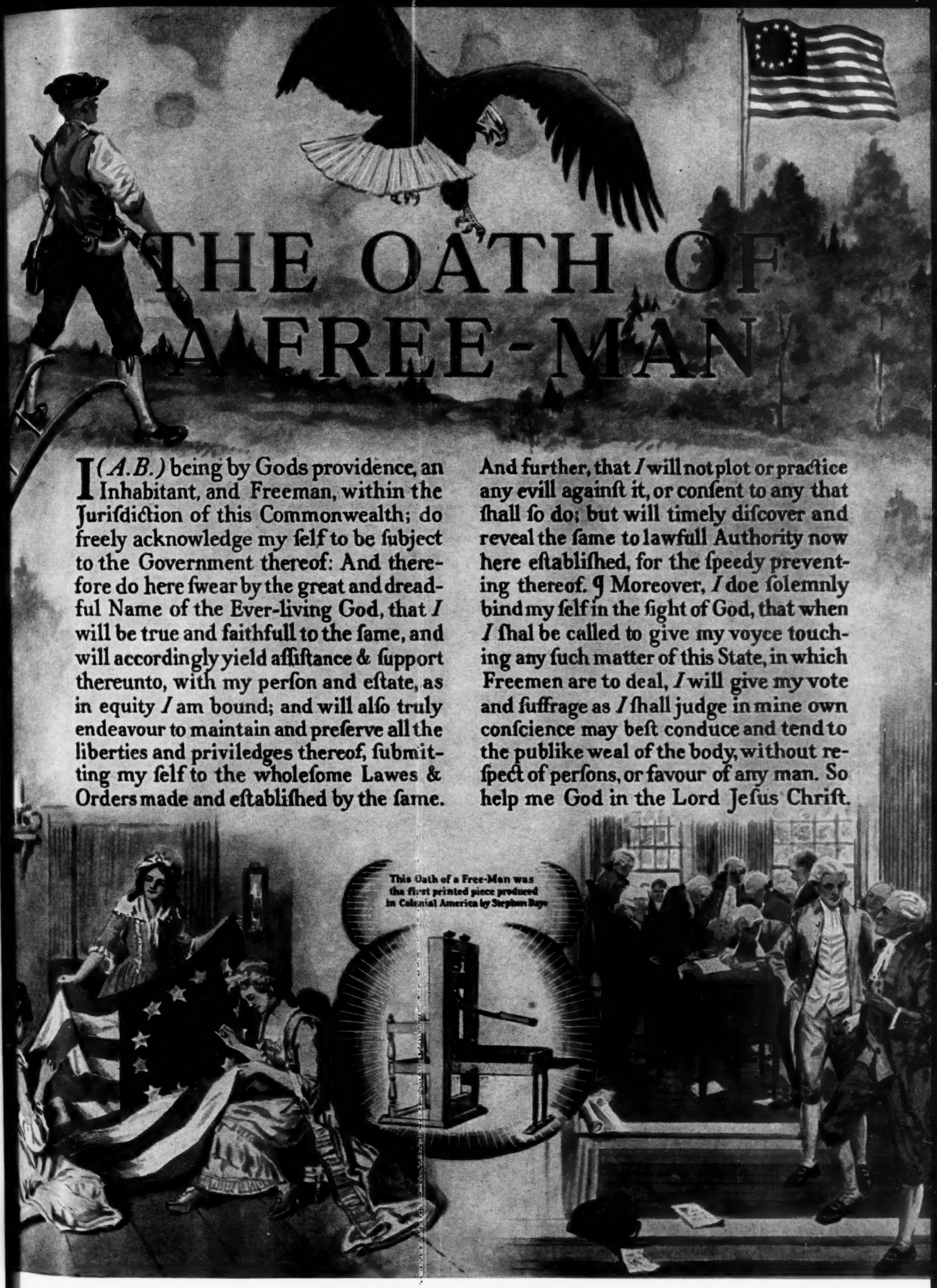
CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY WILMINGTON, DELAWARE

Offices in Principal Cities

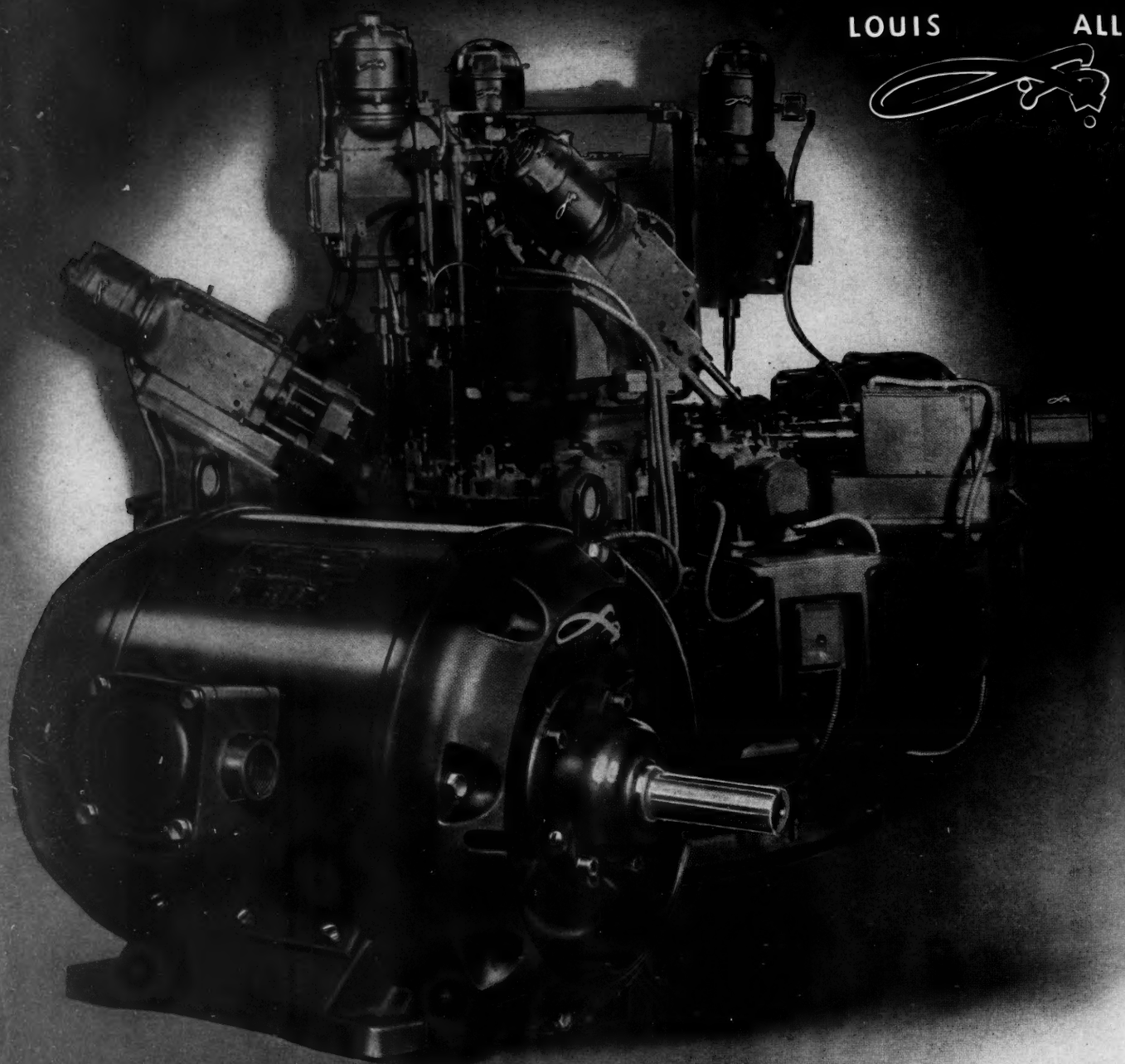
ATLAS EXPLOSIVES

"Everything for Blasting"


THE OATH OF A FREE-MAN
I (A.B.) being by Gods providence, an Inhabitant, and Freeman, within the Jurisdiction of this Commonwealth; do freely acknowledge my self to be subject to the Government thereof: And therefore do here swear by the great and dreadful Name of the Ever-living God, that I will be true and faithfull to the same, and will accordingly yield assistance & support thereunto, with my person and estate, as in equity I am bound; and will also truly endeavour to maintain and preserve all the liberties and priviledges thereof, submitting my self to the wholesome Lawes & Orders made and established by the same. And further, that I will not plot or practice any evill against it, or consent to any that shall so do; but will timely discover and reveal the same to lawfull Authority now here established, for the speedy preventing thereof. ¶ Moreover, I doe solemnly bind my self in the sight of God, that when I shal be called to give my voyce touching any such matter of this State, in which Freemen are to deal, I will give my vote and suffrage as I shall judge in mine own conscience may best conduce and tend to the publike weal of the body, without respect of persons, or favour of any man. So help me God in the Lord Jesus Christ.
This Oath of a Free-Man was the first printed piece produced in Colonial America by Stephen Daye

THE LOUIS ALLIS CO., MILWAUKEE, WIS.

LOUIS ALLIS



Making Good Machinery Better!

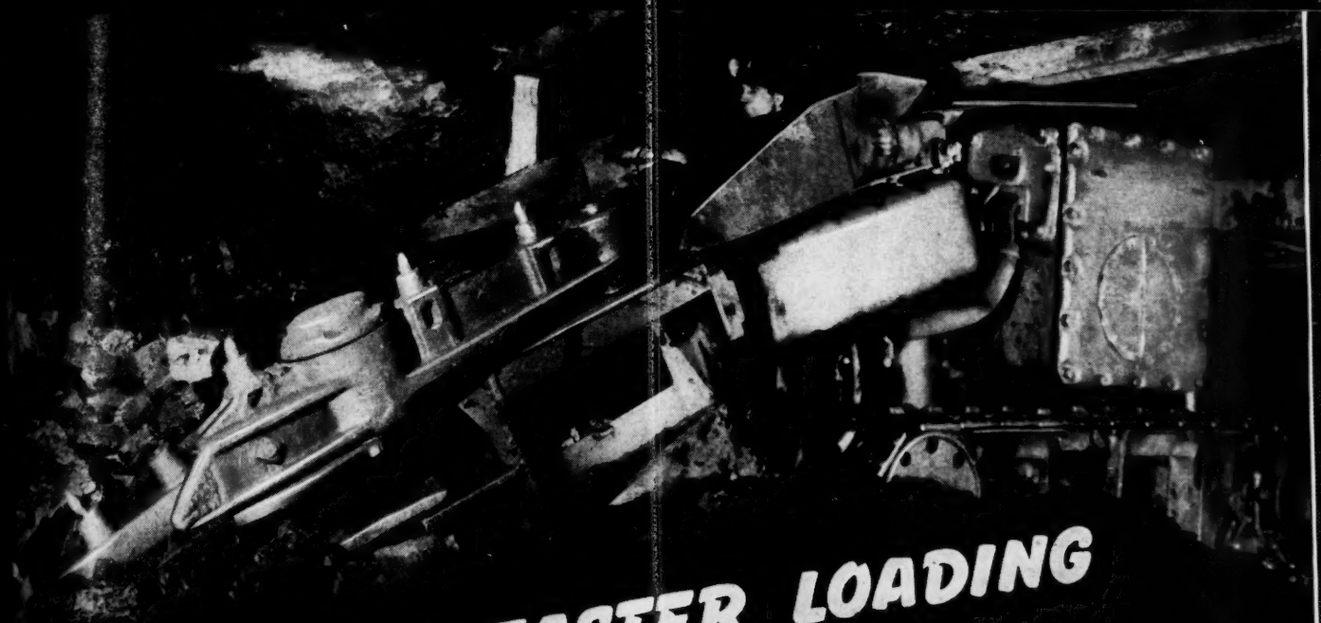
For over 40 years we have been developing special motors for special jobs — working with the designing engineers of many of the nation's leading machinery manufacturers — helping make good machinery better.

No matter what your electric motor problem or requirement may be, we invite your inquiry — and assure you that your needs will receive our prompt and careful attention in every way.

The motor illustrated is our TOTALLY ENCLOSED FAN COOLED Dust Proof motor — which is available in a wide range of electrical and mechanical modifications.

THE LOUIS ALLIS CO., MILWAUKEE, WISCONSIN

BUY WAR BONDS — BUY THEM REGULARLY.



2 AIDS TO FASTER LOADING

NEW SUPERLA MINE LOADER LUBRICANTS

LUBRICATION ENGINEERING SERVICE

A COMPLETE LINE TO HANDLE ALMOST ANY CONDITION IN LOADER LUBRICATION

SUPERLA MINE LOADER LUBRICANTS

Four scientifically blended thickened oils for gears, clutches, transmissions and bearings.

No. 3—A dripless oil for fairly tight gear cases.

No. 5—A fibrous structure thickened oil for gears and transmission. Particularly useful in reducing consumption.

No. 6—A smooth type thickened oil for gear cases and gathering head pots. Can be applied with pressure gun for bearings.

No. 8—A heavy thickened oil for armature bearings and make-up in cases requiring a leakproof lubricant.

INDOILS

Three grades of straight mineral oils for hydraulic systems.

No. 95, **No. 75**, **No. 41** } Provide a range of viscosities to meet all loader hydraulic system requirements.

to help you turn out war-time tonnage

• A NEW LINE of mine loader lubricants to cut down lost machine time and man-hours for lubrication and maintenance.

An engineering service to help you get the right lubricant on every job from face to freight car.

You'll save machine time because one of these four grades of thickened oils will meet your operating conditions more accurately. Various sizes and makes of loaders—new or worn equipment—each can have the exact lubricant needed.

This means less overheating of gears and clutches, less wear and lower consumption—all adding to the time loaders are on the job.

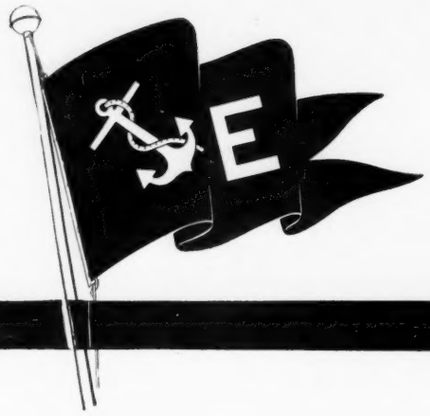
Take advantage of Standard's Lubrication Engineering Service. Start by having an Engineer help you test Superla Mine Loader Lubricant. Just write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the Engineer nearest you, or call any Standard Oil office in the Middle West.

OIL IS AMMUNITION...USE IT WISELY

Copr. 1942, Standard Oil Company

TANDARD OIL COMPANY (INDIANA)

NG...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICA



The Navy's way of saying "Well done!"

THE men and women who work in our Electrical Wire and Cable plants now proudly wear the emblem bestowed by the Navy for notable production achievement. Formal presentation of the Navy "E" award was made June 17, 1942.

The entire American Steel & Wire organization is proud of this tribute, especially because production records are not made by plants and machines, but by the men and women who operate them. The Navy "E" will be a constant inspiration to greater effort and still better records.

The government, of course, has first call on every foot of wire and every product we make. And every person in our employ is determined that wire and more wire, faster and ever faster, shall be our answer to the enemy until the day when Victory is ours.

AMERICAN STEEL & WIRE COMPANY

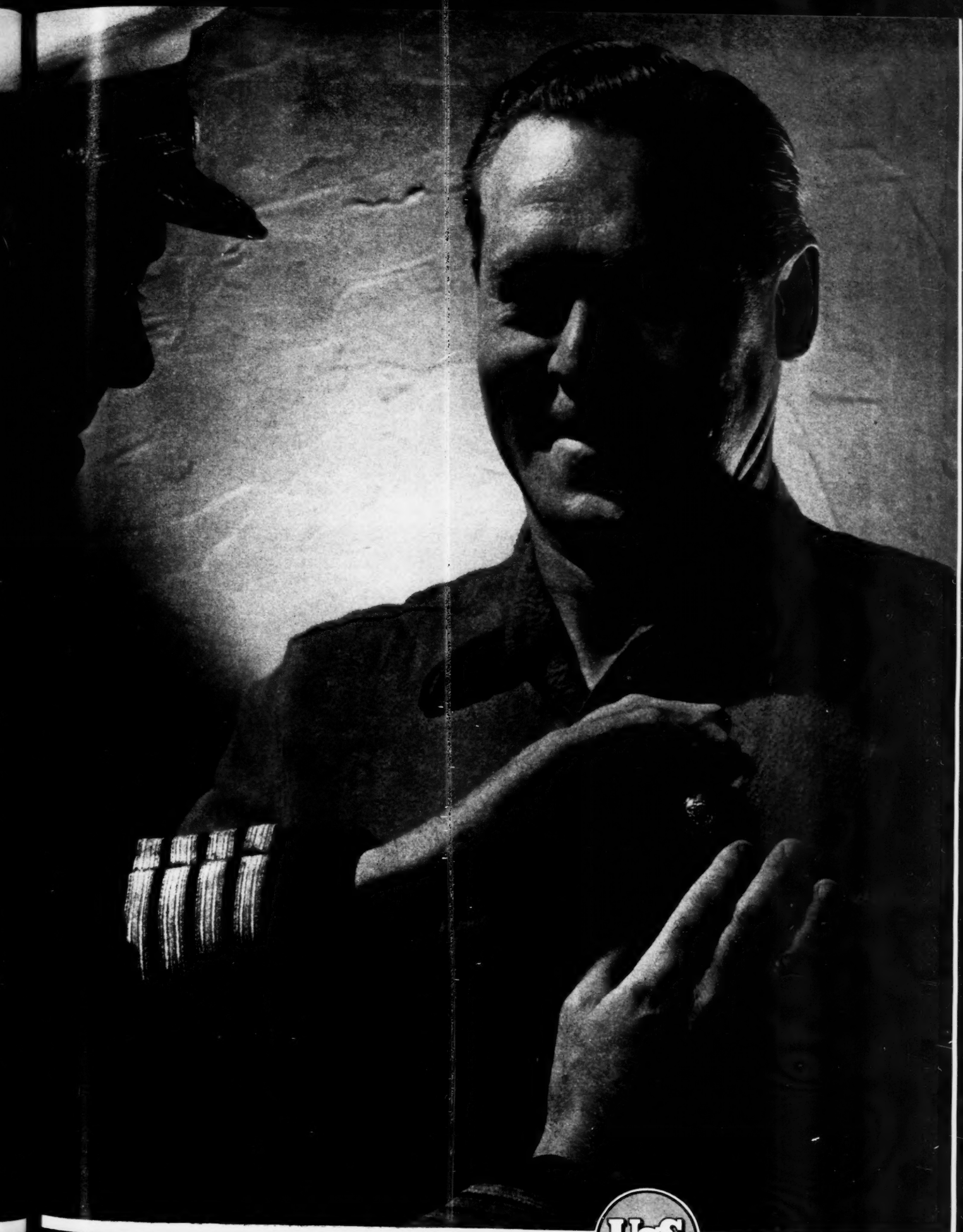
Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* • United States Steel Export Company, New York

ELECTRICAL WIRES AND CABLES

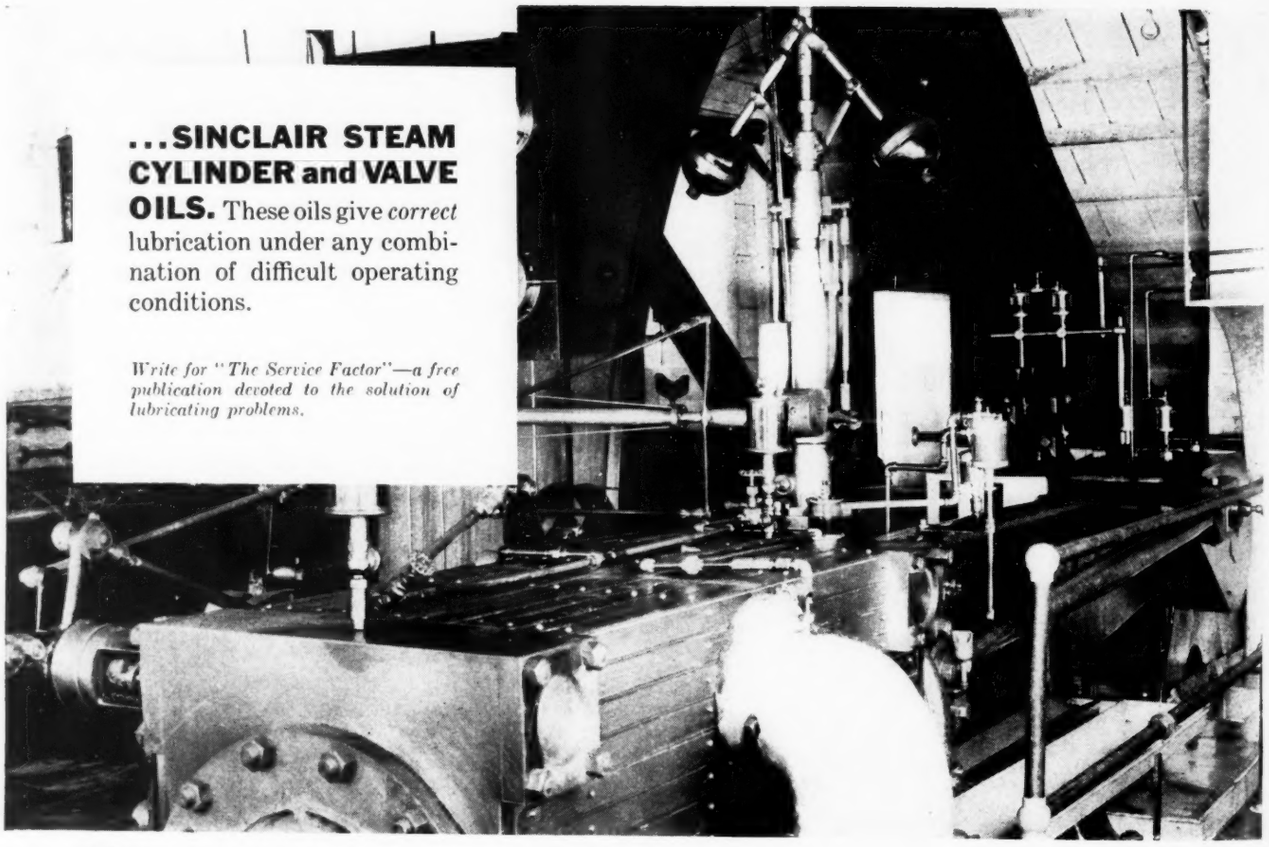
American Steel & Wire Company Electrical Wires & Cables are serving in the vital job of transmitting and distributing power and light. They are manufactured under the closest control, from the first operation to the last, and embody all latest improvements in design and construction.

UNITED STATES S



S STEEL

POWER TO WIN depends on horsepower. For development of full designed power output from *STEAM ENGINES* use . . .



. . . SINCLAIR STEAM CYLINDER and VALVE OILS. These oils give *correct* lubrication under any combination of difficult operating conditions.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.

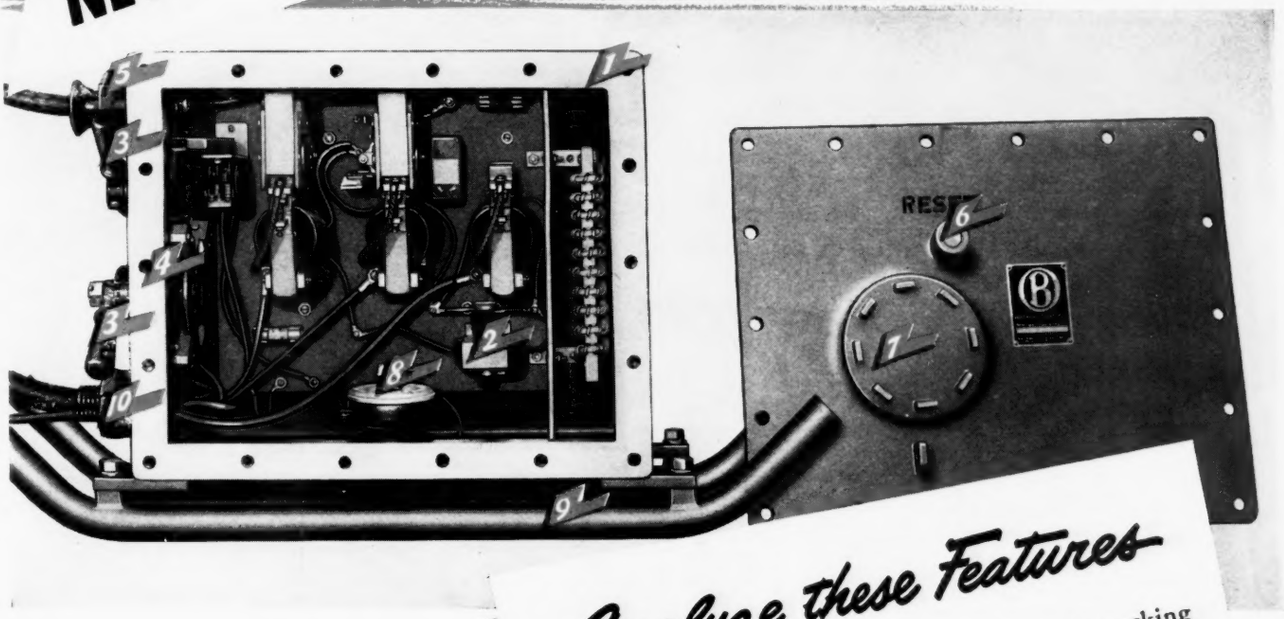
SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE NEAREST SINCLAIR OFFICE

SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago • 10 West 51st Street, New York City • Rialto Bldg., Kansas City • 573 West Peachtree Street, Atlanta • Fair Building, Ft. Worth

Check your starter requirements against the NEW O-B GAS-PROOF MOTOR STARTER



Torture-tested by the U. S. Bureau of Mines and approved as suitable for use with permissible equipment, the new Type BG Automatic Gas-Proof Motor Starter will do much to keep your conveyors and other mechanized equipment running at top efficiency, help you produce more coal faster for the war effort. See your O-B representative for more detailed information—or write today for a new booklet completely describing this modern explosion-proof device.

2300-M

Analyze these Features

1. Explosion-tight case confines any possible damage to interior of case.
2. Choice of timing—hold-out coil for differential timing, Mercury switch for fixed timing.
3. Soft rubber switch handles eliminate possibility of electrical shock.
4. Saving 1/3 in overall size, interlocking reversing switch is built into starter case.
5. Flame-tight packing protects cable entrances.
6. Externally operated pushbutton resets overload latch after tripping.
7. Convenient handhole provides easy access to interior of case.
8. Field rheostat for speed regulation.
9. Skid-mounted for portability.
10. Gland for remote control cable.

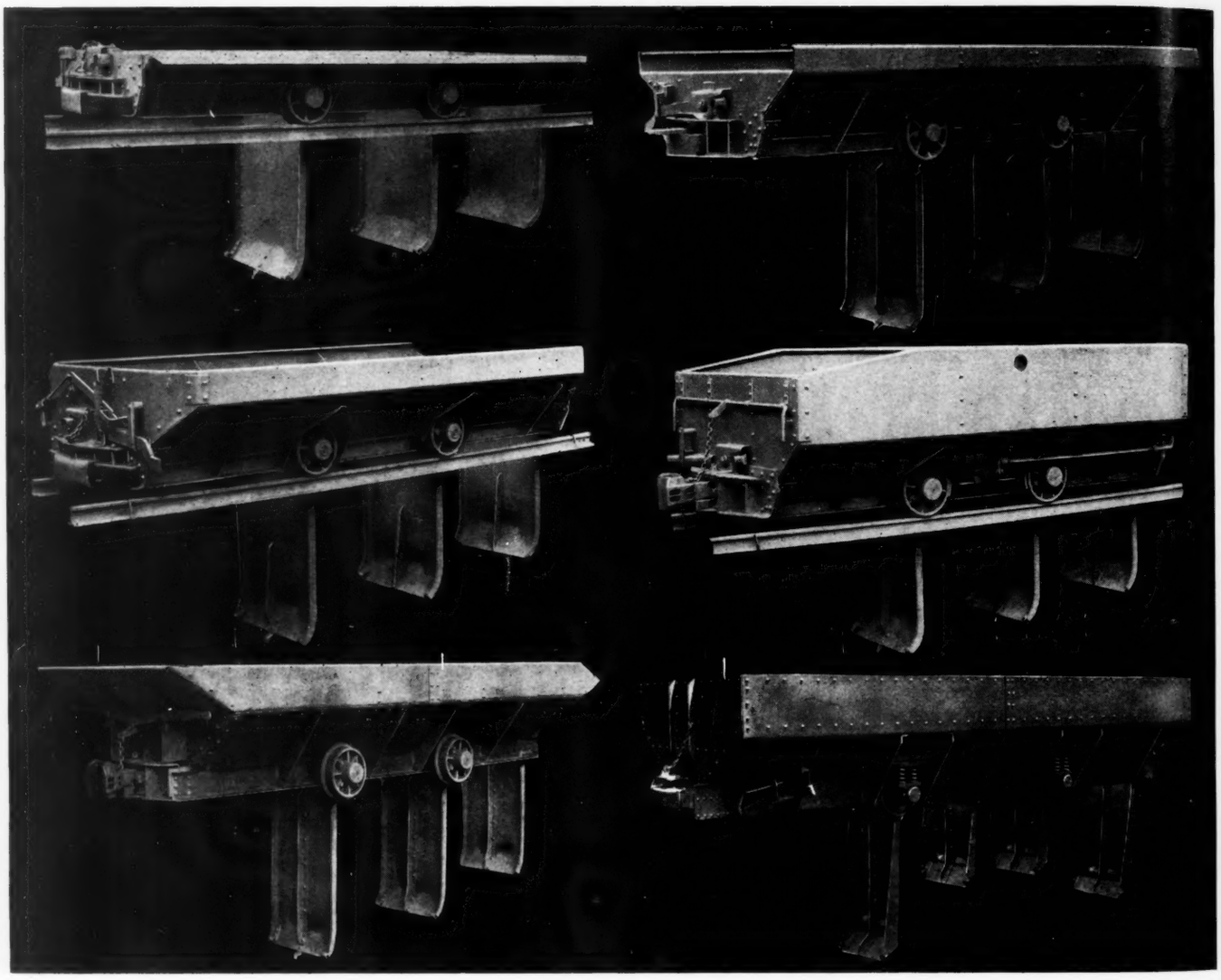
OHIO BRASS

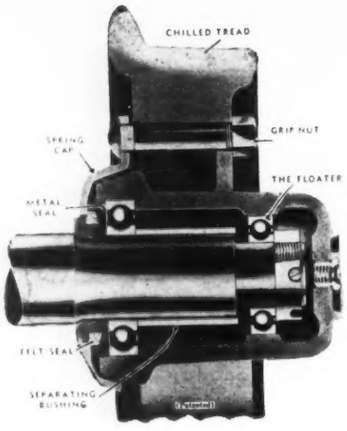
MANSFIELD OHIO·U·S·A

Canadian Ohio Brass Company, Ltd. · Niagara Falls, Ont., Canada

★ BUY United States War Bonds and Stamps ★

Here Are The Cars That Are Production...Cutting Costs D

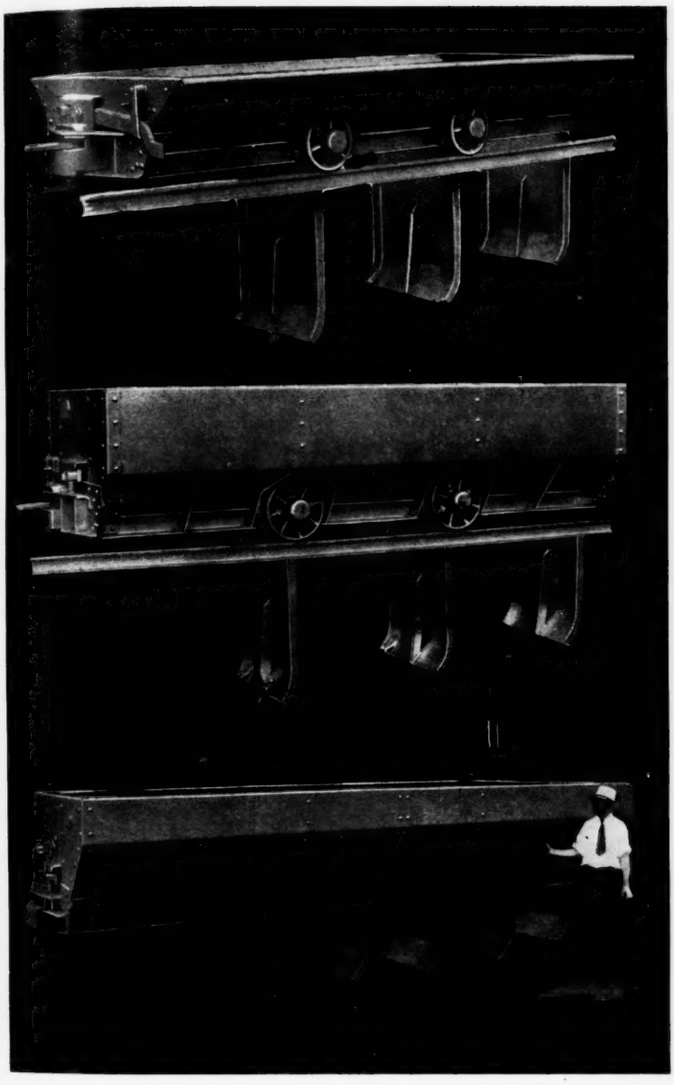




No Mine Car is operating at minimum cost without S-D "Floater" Wheels

• Compared with other types of precision bearings, you can save up to 33 percent in power alone. Independent Engineering tests have proved such savings. A recent test showed a cash savings of $5.51 per car per year. The effective haulage capacity of the locomotive was 49.5 percent greater when pulling cars equipped with "Floater" Wheels. Furthermore, S-D "Floaters" are guaranteed against breakage or bearing failures for 5 years, and if you have to grease "Floaters" more than once in 5 years, we pay the extra cost. It's such performance as this, that we guarantee, that is causing hundreds of smart operators to change over to S-D "Floaters." Copies of engineers' tests sent on request.

Increasing Essential Coal eep and Conserving Man Power!



—and all are S-D "AUTOMATICS"

● An S-D "Automatic" is not just a standard stock car. Every S-D "Automatic" is built special to exactly fit the need of the particular operation it must serve. Dimensions, capacities, loading problems, distances of haul, and many other conditions are involved. The one feature of an S-D "Automatic" that always is standard . . . that means tremendous increases in production . . . great decreases in operating costs . . . big savings in man power . . . is the exclusive S-D 1-2-3 "Automatic" method of dumping.

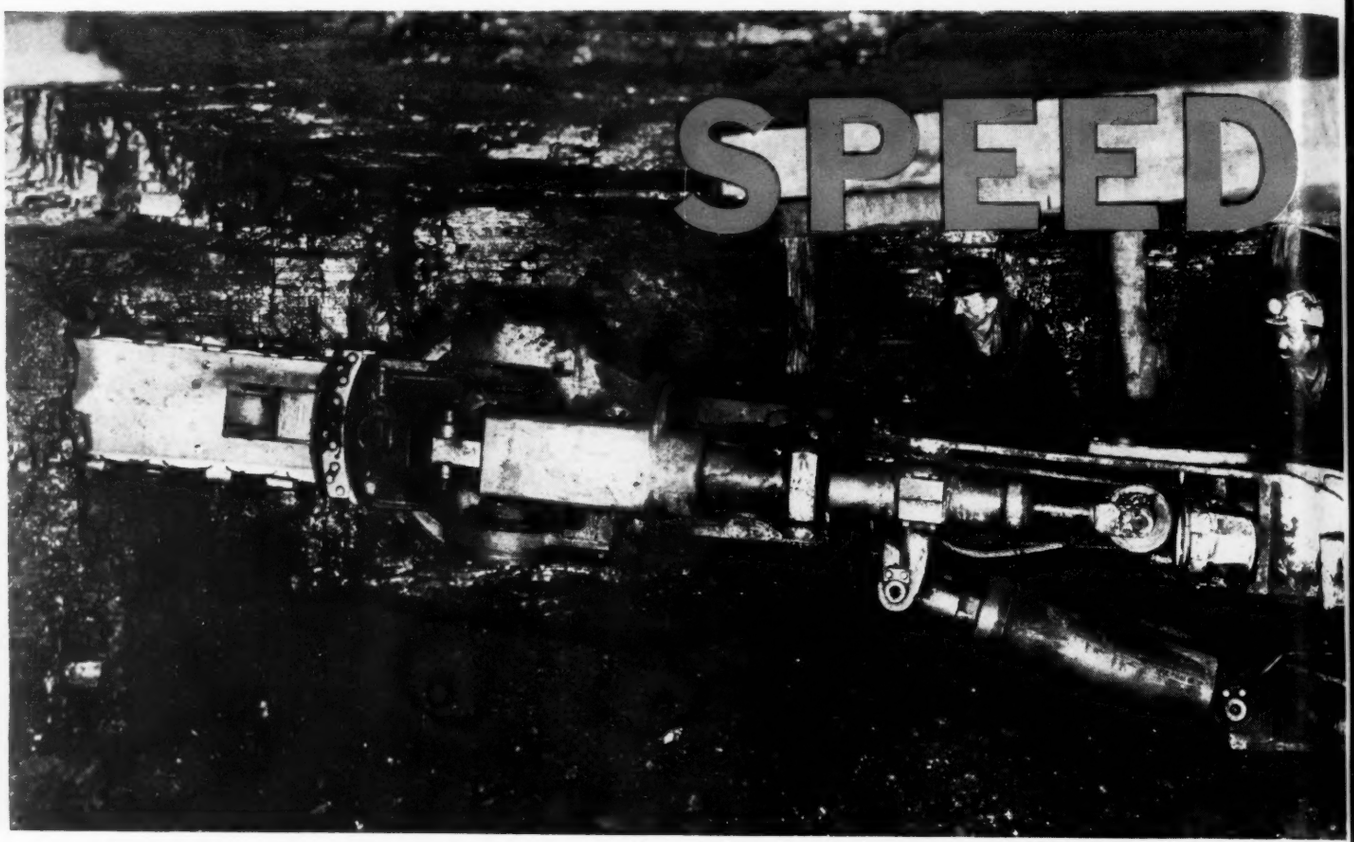
Wherever there is a coal field, you'll find the S-D "Automatic" and its modern system of operation saving from 10 to 40 cents per ton of coal hauled, as compared with old methods, and, in addition, you'll find production increases of 24 percent and up.

If you plan to purchase mine cars, even within the next 12 months, investigate S-D "Automatics" now! The cars shown in this ad are just a few, ranging in capacity from 1½ to 10 tons, which we have built recently. Write to us for a list of users. Let them tell you in their own words what S-D "Automatics" have meant to them in terms of more production, less cost, and saving of man power.

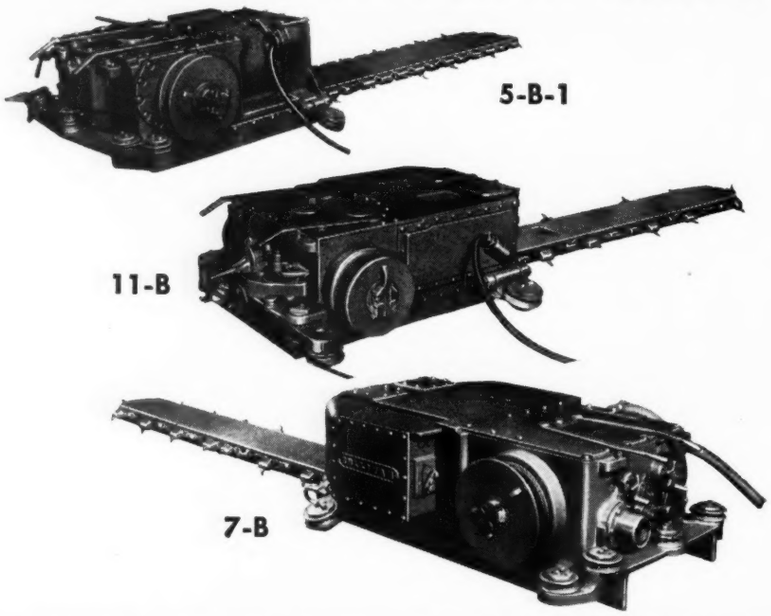
You can have S-D "Automatics" in your mine on a Liberal Rental Plan!

You may have all the advantages of S-D "Automatics" on a liberal rental basis, and the average rental cost over a 15 year period will be less than 2¢ per ton on the coal hauled. Free maintenance parts for car bodies are supplied under contract for several years period. For the same period, grease is supplied free where S-D "Floater" Ball Bearing Wheels are used. Ball bearings and wheel castings have separate guarantees for five years use. All the time, you will have an option to purchase the cars and terminate the rental contract.

Sanford-Day Iron Works, KNOXVILLE, TENNESSEE



SPEED UP PRODUCTION WITH SULLIVAN SHORTWALLS



5-B-1 SHORTWALL with lever control of rope drums for faster, easier handling. Has a 10 horsepower motor and is the lowest machine on the market that discharges cuttings to the rear.

11-B SHORTWALL with 20, 35 or 50 horsepower motors, and the lowest cutter in its power range that discharges cuttings to the rear. It's the shortwall for conveyor mining.

7-B SHORTWALL. 50 horsepower. Particularly adaptable to modern mechanized mining, because its cutting capacity is greater than that of loading units.

THE SULLIVAN 9-B OVERCUTTER, (NOT SHOWN), IS ESPECIALLY DESIGNED TO MEET EVERY SEAM CONDITION.

S SULLIVAN *Products* SPEED PRODUCTION for VICTORY

SULLIVAN

"WE SPECIALIZE IN COAL CUTTERS"

Coal Mining Machines · Scraper Haulers
Rock Loaders · Hoists · Car Pullers
Air Compressors · Rock Drills
Cutter Bit Sharpeners and Heaters
Core Drills and Core Drill Contracting.

THE JOB WITH THE SULLIVAN 7-AU TRACK CUTTER

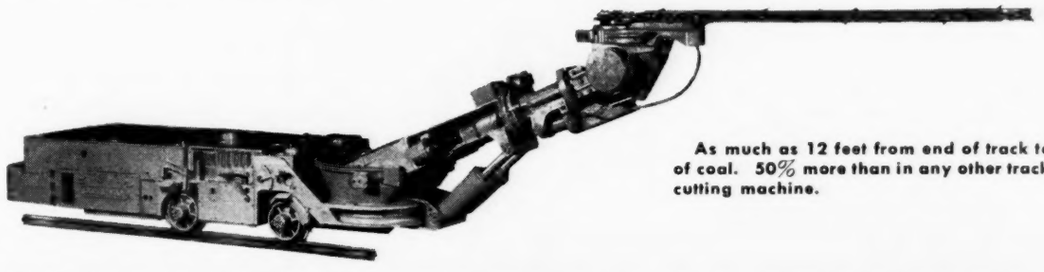
7-AU Track Cutting Machines help to speed the whole job of face preparation

Because the 7-AU has a reach fully 50% longer than ordinary machines of this type, it eliminates delays due to track laying, cutting room necks and failure to clean up.

Track can be kept away from the face, allowing crawler-mounted loaders to operate faster and clean up better. Less track also means less chance of breaking caterpillar treads, and this, too, prevents delay.

In mines where center shearing and side shearing are used to reduce the amount of drilling, or where sidecutting a heading fits it for a permanent haulway, the 7-AU is equipped with big hydraulic cylinders to quickly rotate the cutter head for shearing operation.

The 7-AU is a sturdy machine, built for fast work and steady production. It helps make the most of your other machine equipment for the whole job of preparing the face.



As much as 12 feet from end of track to face of coal. 50% more than in any other track-type cutting machine.

THE SULLIVAN 7-AU IS LICENSED UNDER PATENTS TO E. C. MORGAN. PATENTS No. 1,706,961, 1,706,962, 1,707,132, 1,953,325, 1,953,326.

SULLIVAN MACHINERY COMPANY

EXECUTIVE OFFICES — MICHIGAN CITY, INDIANA

Factories: MICHIGAN CITY, IND.; CLAREMONT, N. H.; GRANTHAM, ENGLAND

Associated House: CANADIAN SULLIVAN MACHINERY CO., Ltd., Dundas, Ont.

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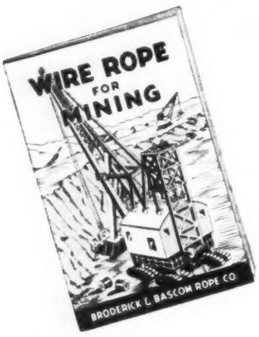
Pittsburgh, Pa.
San Francisco, Calif.
Salt Lake City, Utah
Scranton, Pa.
St. Louis, Mo.
Johannesburg

Use the wire rope that's cut out for today's jobs

There's no place for slack in the coal industry's program—or in a vital mining cable. To accelerate production, to strengthen your defense against equipment shutdowns, you need the workability and durability of Preformed Yellow Strand. With this time-tested wire rope handling the load, giant stripping and loading shovels can take the full bite. Main hoists can utilize their high speeds with safety. Above and below ground, cable-using machines can move closer to capacity operations and put off replacements.

These gains result from pointing up Yellow Strand's stout, drawn-to-order steel wires with the limberness of preforming. The rope reeves easily . . . runs freely around small sheaves . . . spools evenly despite overloads. Still every length is as tough as ever—highly resistant to shock, abrasion and drum crushing. Today time-and-labor-saving cable counts *double* in production. Install Preformed Yellow Strand and help your men and machines deliver to the limit.



FREE— this 96-page Mining Hand Book of useful wire rope facts and tables. Send for it today.

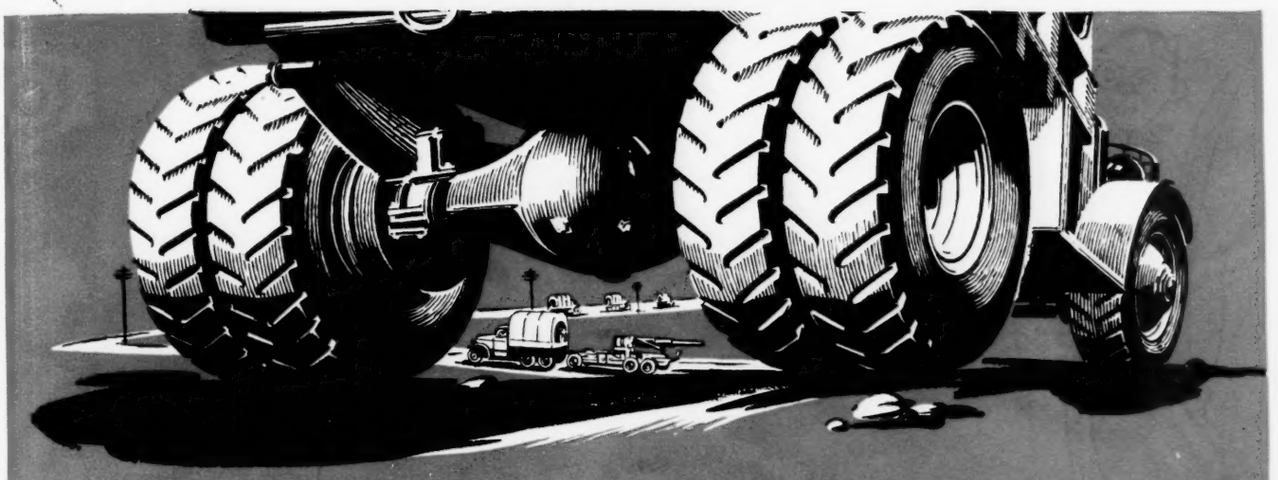
BRODERICK & BASCOM ROPE CO., ST. LOUIS

Branches: New York • Chicago • Houston • Portland • Seattle

Factories: St. Louis • Seattle • Peoria

YELLOW STRAND PREFORMED WIRE ROPE ★ ★ ★ ★

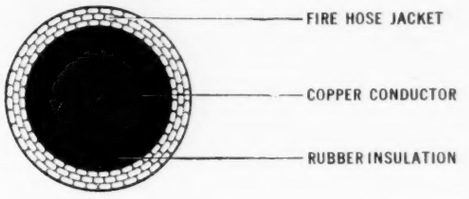
A MAINSTAY OF NATIONAL DEFENSE



HOW TO SAVE RUBBER ON PORTABLE CORDS AND CABLES

Use Duracord!

Here's one way you can effectively conserve the critical rubber supply and still get long-lived heavy duty portable electrical cords and cables . . . with Duracord.



DURACORD* was developed during the last war to meet the need for super-strength cords and cables. This Anaconda construction has served in some places for more than twenty years and it is still in use today. It is *not* a new construction, adopted temporarily, because of the rubber shortage.

The Duracord cover, woven from long fiber cotton, like a fire hose, replaces the rubber jacket on all rubber cords, making possible rubber savings as high as 50%. See the cross-section above for the detail.

ANACONDA
from mine to consumer

This familiar trade-mark symbolizes the best efforts of modern research and production.

For further information, please write us immediately.

SUNEX SECURITYFLEX TO WAR

This well-known, all-rubber companion to Duracord has been pre-empted for the toughest kind of jobs in the war effort. Until peace, its use will be strictly regulated.

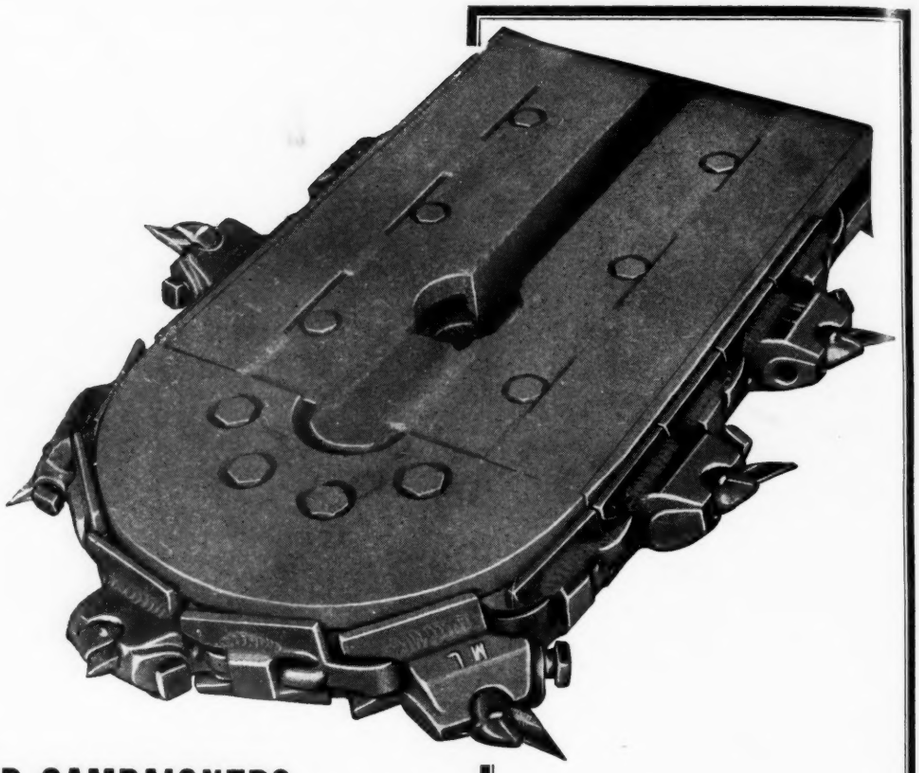
ANACONDA WIRE & CABLE COMPANY
Subsidiary of Anaconda Copper Mining Company
General Offices: 25 Broadway, New York City
Chicago Office: 20 North Wacker Drive
Sales Offices in Principal Cities

*Reg. U. S. Pat. Off. 42254

Sunex Securityflex and Duracord

ANACONDA WIRE & CABLE COMPANY

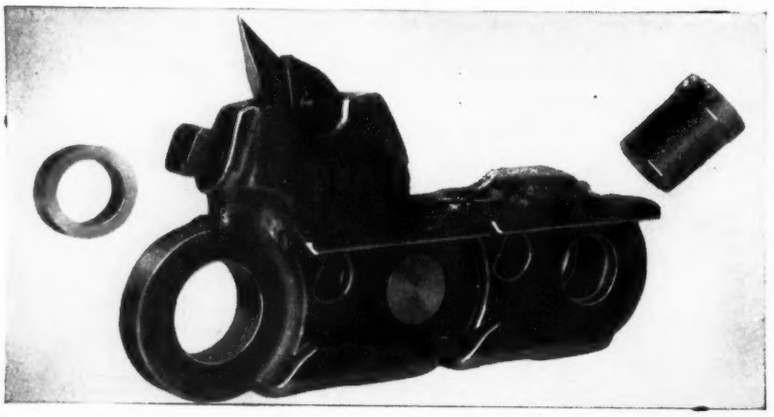
GENERAL JIM SLIM SAYS:-



"WE'RE SEASONED CAMPAIGNERS...

THE IDEAL COMBAT TEAM TO DEFEAT HIGH COAL CUTTING COSTS...

... the BOWDIL CUTTER BAR, CHAIN and ME"



Veterans in the battle against excessive coal cutting costs, the Bowdil team—bar, chain and bit—represents sound security wherever rising coal production costs are encountered. Time and again, these BOWDIL items, singly and together, have achieved outstanding economies on many operations in the vital coal cutting phase of mining.

Thus it is that they are ideally suited today to step in and save on your operations. The newly designed BOWDIL Bar, with its Z-Bar construction and reinforced stress points . . . the rebuilt BOWDIL Chain with its high efficiency factor . . . and new BOWDIL Concave Cutter Bits that give 15% to 20% longer service life —these are the seasoned campaigners who can give you a boost on your coal cutting output . . . they've proved their worth!

Therefore, we urge you to get in touch with us on every coal cutting problem. If you feel that this important operation is out of line as far as cost is concerned, call in a BOWDIL engineer—his advice and recommendations can help you to achieve rock-bottom costs for coal cutting. Write us today for full details.

FACED WITH A COAL CUTTING PROBLEM? . . . LET US HELP YOU SOLVE IT!!

The BOWDIL Company
Canton COAL CUTTING EQUIPMENT Ohio

INSTALLED IN
1911

INSTALLED IN
1940

INSTALLED
TODAY

IT PAYS TO STANDARDIZE ON WESTINGHOUSE SK MOTORS

. . . because the SAME REPLACEMENT PARTS FIT ALL THREE

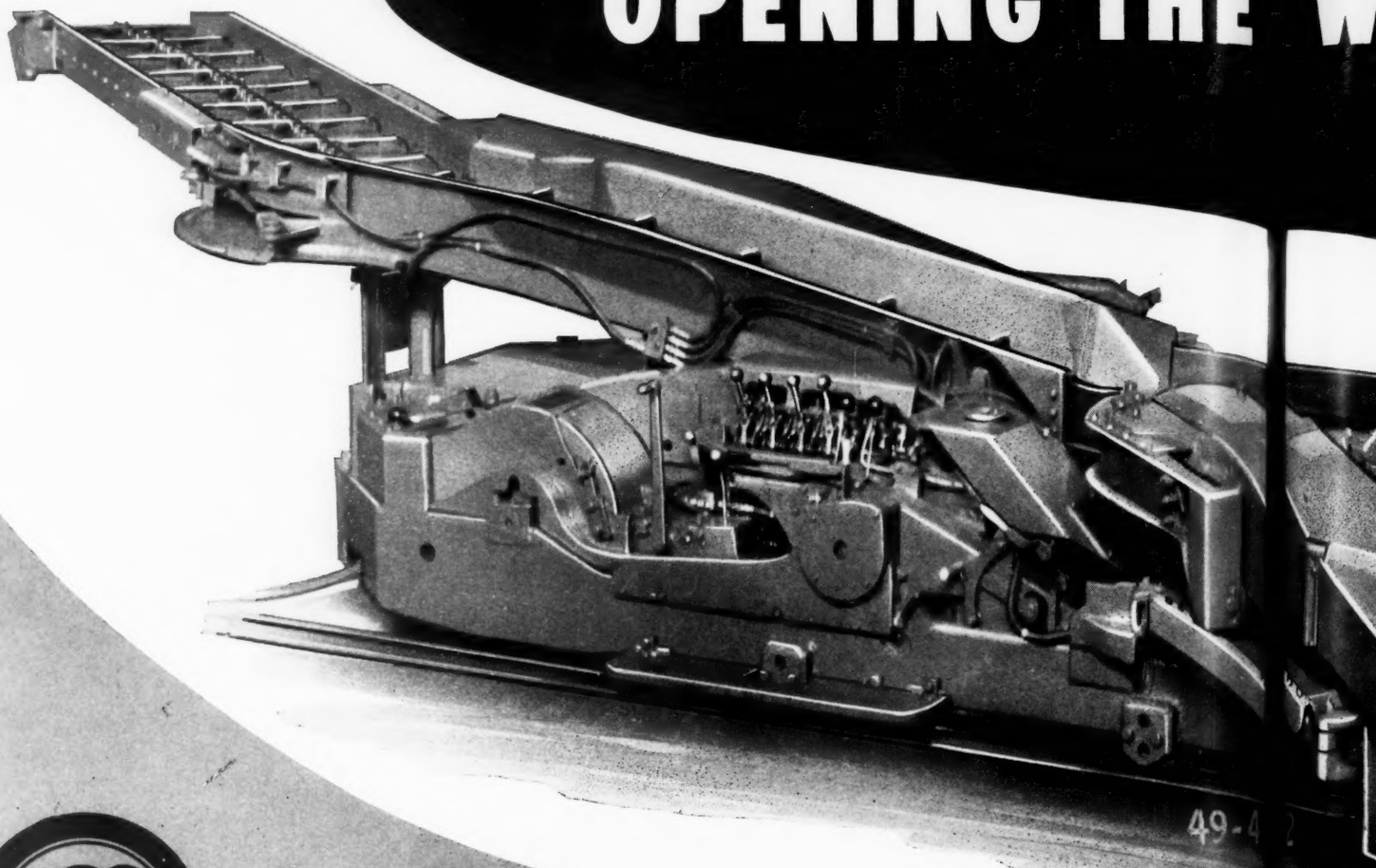
It is not necessary to carry a large stock of replacement parts when your mines are equipped with Westinghouse Type SK Motors. Parts made for today's motors will fit any of the previous ones. For instance, the sealed-sleeve bearings which are standard on today's motors can replace the bearings used on the first SK Motor built in 1911. The basic design has not been changed since the first one was built 31 years ago. No need to. Its trouble-free performance, stamina and efficiency operating under almost every conceivable condition have proved its excellence. It was the most modern d-c mining motor in 1911. It is the most modern d-c mining motor today.

Of course, improvements have been made. The parts you order for your SK Motors . . . bearings, armatures, brackets or brushes . . . all incorporate the most advanced refinements found on brand-new motors. And you pay no premium for obsolescence.

Take advantage of this standardized design on the next motors you order, whether they are for pumping, cutting, loading, conveying or hoisting. SK Motors are available in a wide range of ratings, speeds and enclosures. Ask your Westinghouse Representative for complete information. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N. J-21210

Westinghouse SK Mining Motors

OPENING THE W



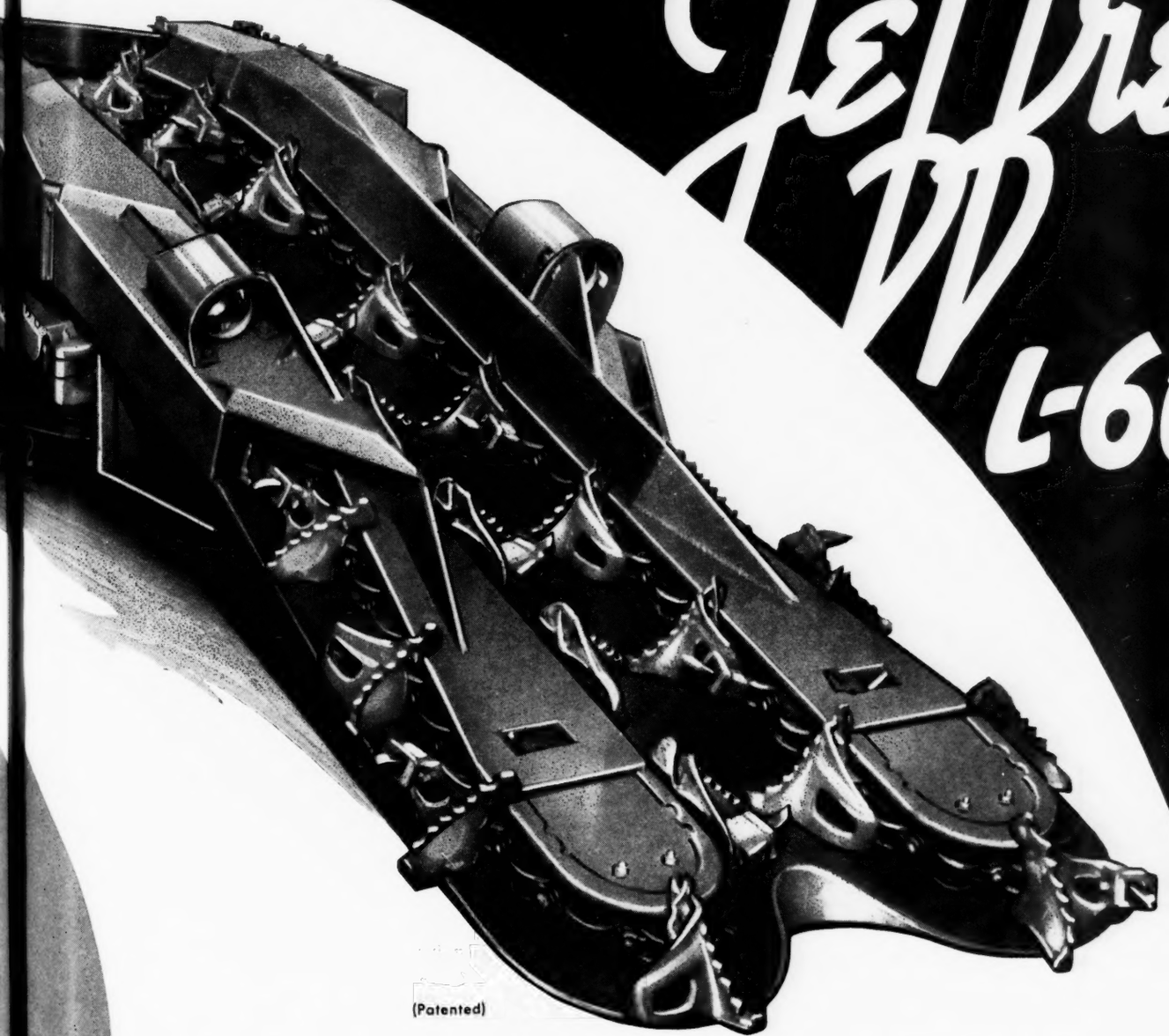
- Capacity to meet today's urgent demands
- Flexibility to overcome operating conditions
- Finger-tip hydraulic control and automatic cable reel to speed all movements
- Strength to load huge tonnage

All these and more . . . make for profitable mechanized loading . . . more coal per shift.

The Jeffrey L-600, a frontal attack, track mounted loader, opens the way to greater tonnage . . . lower costs per ton.

WAY TO GREATER TONNAGE

Jeffrey L-600



(Patented)

THE JEFFREY MANUFACTURING COMPANY

912-99 North Fourth Street • Columbus, Ohio

Sales Offices: BALTIMORE, BIRMINGHAM, BOSTON, BUFFALO, CHICAGO, CLEVELAND, CINCINNATI, DETROIT, DENVER, HARLAN, HOUSTON, HUNTINGTON, MILWAUKEE, NEW YORK, PHILADELPHIA, PITTSBURGH, SCRANTON, ST. LOUIS, SALT LAKE CITY

Service Stations: PITTSBURGH • HARLAN, KY. • BIRMINGHAM • ST. LOUIS • LOGAN-BECKLEY, W. VA. • SALT LAKE CITY • SCRANTON

It Takes Guts to Work in a Mine

and here's the Cable that has it . . .

There's no sense in sending equipment up to the face if its innards aren't wired with *permanently insulated* cable. Sooner or later — and probably *sooner* — it's going to bounce right back into your repair shop for another rewiring job!

What you really need to keep your cutters, loaders and locomotives on the job is *permanently insulated* Rockbestos A. V. C. Mining Cable. Neither heat, moisture, oil, grease or vibration can harm it because it will not rot, bloom, dry out, crack, burn, or break down under copper-heating overloads. You can put it in and know that your maintenance is going down and your equipment is going to produce more tonnage.

Use Rockbestos A. V. C. for MORE tonnage and LESS time-out! The jobbers listed below can supply the original.

1 Flexible tinned copper conductor is perfectly and permanently centered in helically applied insulation.

2 Paper separator prevents insulation from sticking to the conductor, makes stripping easy.

3 Heatproof felted asbestos is unaffected by conductor-heating overloads and doesn't burn even when exposed to copper-melting arcs.

4 Varnished cambric for high dielectric strength and added moisture resistance, protected from heat, flame and oxidization by two felted asbestos walls.

5 Outer felted asbestos wall serves as a heat-barrier against high ambient temperatures.

6 Heatproof, fireproof asbestos braid, resistant to moisture, oil, grease and alkalies, is diametered to properly fit bushings.

For sizes and diameters refer to McGraw-Hill Coal Mining Catalogs or write to Rockbestos Products Corporation, P. O. Box 1102, New Haven, Conn.

ROCKBESTOS A.V.C.

The Cable with Permanent Insulation

ORDER FROM THESE JOBBERS — SPECIFY "ROCKBESTOS A. V. C."

BECKLEY, W. VA.:	Beckley Mach. & Elec. Co.	EVANSVILLE, IND.:	Evansville Elec. & Mfg. Co.	MIDDLESBORO, KY.:	Rogan & Rogan Co.
BIRMINGHAM, ALA.:	Moore-Handley Hdwe. Co.	FAIRMONT, W. VA.:	Fairmont Supply Co.	PITTSBURGH, PA.:	Upson-Walton Co.
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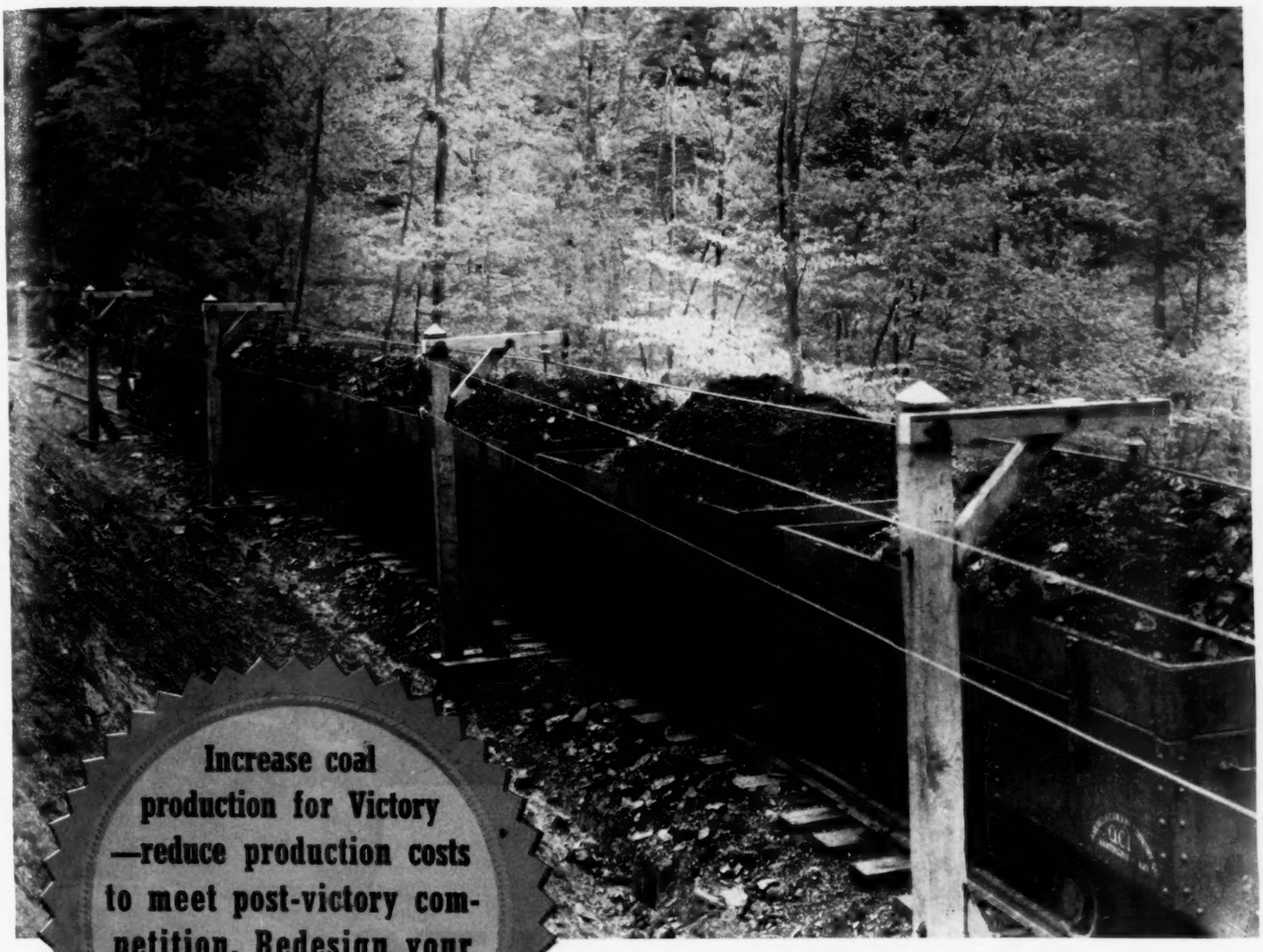
CLEVELAND, OHIO:	Upson-Walton Co.	LOTHAIR, KY.:	Mine Service Co.	SCRANTON, PA.:	Penn. Elec. Engineering Co.
				WILLIAMSON, W. VA.:	Williamson Supply Co.



Increase coal production for Victory —reduce production costs to meet post-victory competition. Redesign your mining equipment to include more Timken Bearings.

Part of a trip of the Timken Bearing Equipped 10-ton, drop-bottom, all-steel mine cars operated by the Gay Mining Company, Timbar, W. Va. These cars were manufactured by the American Car & Foundry Company. This new mining enterprise began shipping coal May 4.

Mine cars and mining equipment of all kinds must be capable of higher speeds, must have greater endurance and cost less for operation and maintenance in order to keep up with the programs of war and peace.

TO ASSURE VICTORY
BUY UNITED STATES WAR SAVINGS BONDS & STAMPS

A few Timken Tapered Roller Bearings are better than none, but the more there are in any piece of equipment the closer it will come to meeting every demand now and after Victory.

Make sure that the mine cars and other mining equipment you manufacture or use are fully protected with Timken Bearings against friction; wear; radial, thrust and combined loads; and misalignment. Then they will be ready for anything—come what may.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

This Simple Idea . . .
is SAVING BELTS
for *Industry*. . . and Rubber for the *Nation*

To see for yourself the belt-saving importance of the CONCAVE SIDE, just pick up *any* V-belt and bend it as it bends when it goes around a pulley.

As the belt bends, grip its sidewalls firmly with your fingers as in the photograph above. You will feel the sides of the belt *change shape*. If the sides were straight before bending, they will *bulge outward* as the belt bends. (See Figure 1 on the right).

Now look at Figure 2. Here you see how bending changes the shape of a belt that is built with the patented Concave Side. The side becomes perfectly *straight*. This belt, when bent, precisely fits its sheave groove. Here are the savings:—(1) There is no side-bulge. This means *uniform* wear—*longer* life—a saving in belts for you, a saving in rubber for the Nation. (2) The full side-width of the belt uniformly *grips* the sheave groove wall—carries heavier loads without slippage—another saving of belts and a saving in power, too!

Only belts built by Gates are built with the Concave Side, a Gates patent.

What Happens When a V-Belt Bends

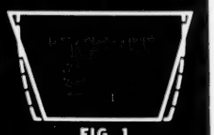


FIG. 1

FIG. 2

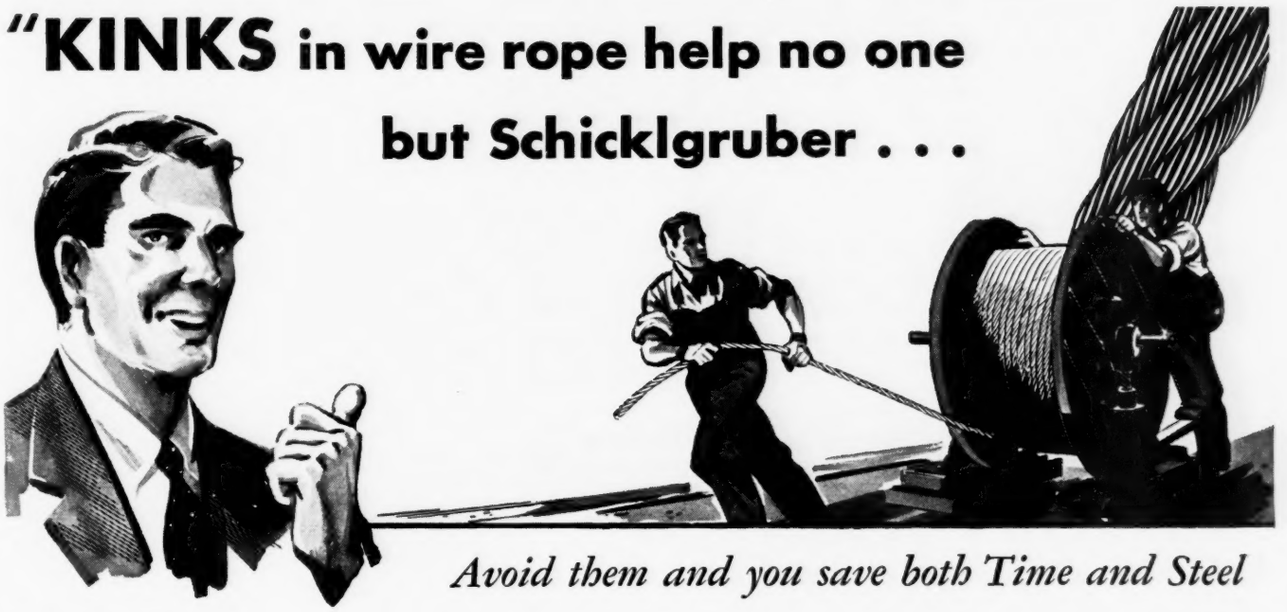
THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

Chicago, Ill. 549 West Washington
New York City 215-219 Fourth Avenue
Birmingham, Ala. 405 Liberty National Life Bldg.
Los Angeles, Cal. 2240 East Washington Blvd.
Denver, Colo. 999 South Broadway
Dallas, Tex. 2213 Griffin Street
Portland, Ore. 333 N. W. 5th Avenue
San Francisco, Cal. 2700 16th Street

"KINKS in wire rope help no one but Schicklgruber . . .



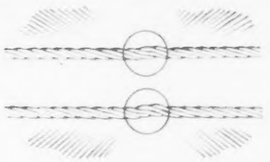
Avoid them and you save both Time and Steel

To the experienced wire rope user it may sound trite to say wire rope is a costly machine and must be treated as such. But there may be young fellows under you handling Roebling rope today who haven't learned by experience, and it's up to you to see that nothing they do will waste the valuable time and rope steel so vitally needed. Unloading the reel is just one way that a beginner may damage a rope. So tell him first that a reel of rope, like a motor or other piece of valuable equipment, should be handled carefully and not dropped from a truck or platform. Nor should it ever be moved by *prying against* the coiled rope.

But it's in kinking that the most serious damage is likely to occur. A kink starts as a loop like this!

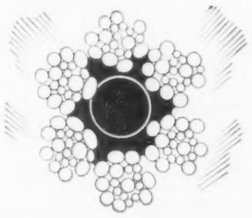
If it gets pulled tight, the damage has been done. The uniform relative position of the strands and wires has been disturbed—causing unequal stress distribution and abrasive wear that brings early failure at this point when the rope is put to work.

Even though you think you've straightened out a kink, looseness and high strands will appear. Because as the rope straightens after kinking, an extra twist is thrown into the strands that can never be removed. Here's a kinked rope under 10,000 pounds tension, and below it the same rope after the tension had been relieved . . .



But notice that the kink remains. That means very severe abrasive wear on the high strands and abusive strain on the drawn strands since they carry more than their share of the load. To show you what happens to the drawn strands inside the rope, here is one cut through at the kinked section.

Notice how the hemp center is compressed; some strands are drawn in and others forced out.



All right, kinks are wasteful . . . but it's just as easy to avoid them as it is to put them in. Remember, kinks start as loops—caused in most cases by taking rope from a stationary reel or coil. *The remedy is simple*—always unwind wire rope straight ahead by rotating the reel or coil. Don't let the reel get going faster than your rope is coming off. Always keep some tension on the rope if at all possible. Most people put a shaft through the center of the reel and jack it up—as shown in the big illustration at top. If it's in a coil, simply roll it along the floor like this . . .

It's as easy as that to avoid kinking during installation (where most kinks occur). Have these rules followed by every man who handles it, and you'll be on the way to getting all the *extra* service that's built into every inch of wire rope that bears the Roebling trademark."

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches and Warehouses in Principal Cities

★ PROMPT SERVICE
★ on essential orders
★ from warehouse
★ stocks or mill

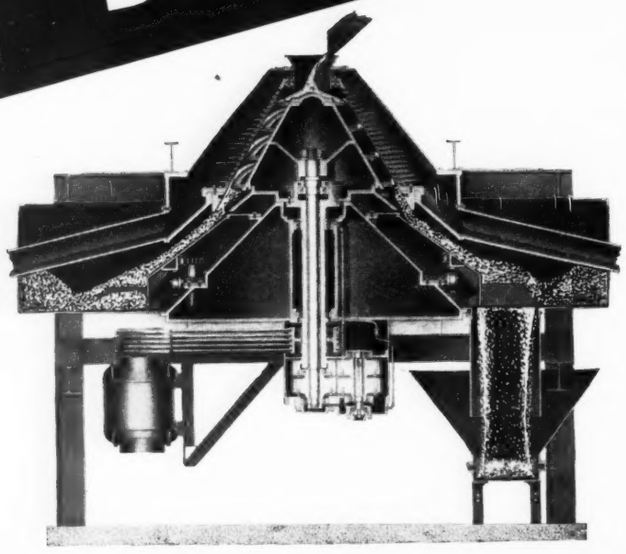
ROEBLING
"Blue Center"
STEEL WIRE ROPE
PREFORMED OR NON-PREFORMED

SPEED SHIPMENTS

AND AT THE SAME TIME

DO THIS AT THE LOWEST COST

"C-M-I" *Continuous Centrifugal* DRYER

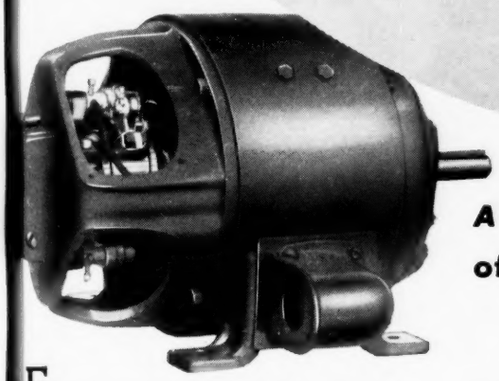


★ By using this Continuous Centrifugal Dryer to de-water and dry the finer sizes, less floor space, lower first cost, and low maintenance and operating costs are a few of the advantages you secure. For, freezing of the coal in transit or in storage, and clogging of bins, spouts, and cars is eliminated.

CENTRIFUGAL AND MECHANICAL INDUSTRIES, INC.

SECOND AND PRESIDENT STREETS ST. LOUIS, MO.

See How INSULATION STRENGTH Is Built into These D-C FIELD COILS



A Feature of this D-C Motor

FIELD COILS of G-E direct-current motors are wound with Formex wire for two important reasons:

1. Coils wound with Formex wire—the toughest magnet wire yet developed—have extraordinary resistance to abrasion, heat shock, mild acids, and alkalies. Hence the field coils are built to have strength against any possible short circuits or failure.

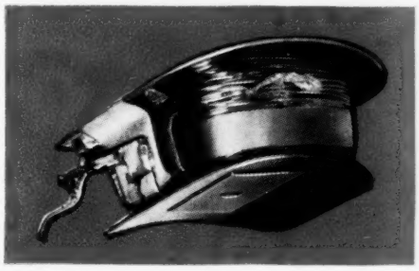
2. Coils can be made more compact when wound with Formex wire. This increases heat-dissipation ability, allows more ventilation space, and reduces possibility of a burnout or "hot spot."

This is only a small part of the story on the new General Electric d-c motor, however. Why not get full details on the entire motor—from built-up commutator and heavy-duty brush rigging to such convenience features as easy reversal without changing any part of the frame, fan, or brush rigging? Call or write your G-E representative for complete information. And be sure to send for your copy of the latest bulletin on d-c motors, GEA-1542E. General Electric Company, Schenectady, N. Y.

●

Unusual Construction of Commutating Field Coils of Smaller Motors

A Textolite box covers the laminated-steel pole piece and is tightly molded into shape under pressure. Tough Formex wire coils are then wound compactly on this assembly. They are then bonded with a thorough, baked-in impregnation of synthetic resin. This results in a rigid, nonchafing, long-lasting assembly.



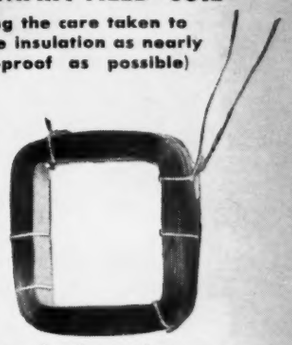
LOOK TO G.E. FOR D-C

GENERAL ELECTRIC

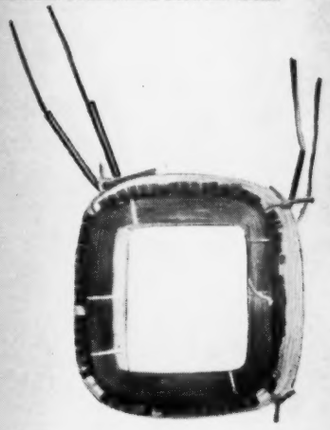
750-71-8398

4 STEPS IN THE MANUFACTURE OF THE MAIN FIELD COIL*

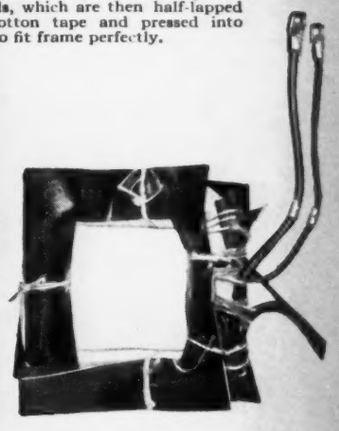
(showing the care taken to make the insulation as nearly failure-proof as possible)



Both shunt and series portions are wound with tough Formex wire, in those ratings for which the right Formex wire sizes are available. Coils are wound in pairs, eliminating external connections between them.



Layers of varnished cambric separate the coils, which are then half-lapped with cotton tape and pressed into shape to fit frame perfectly.

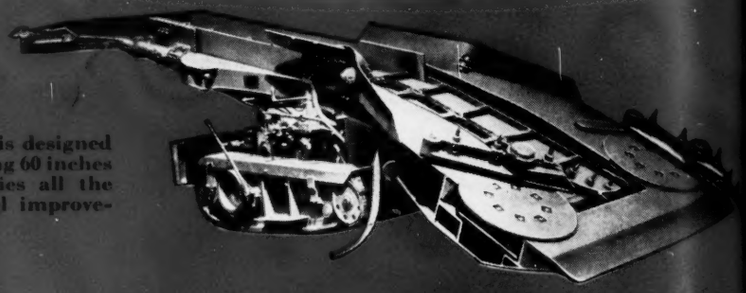


Varnished cambric is again applied—to both sides of the coil for additional protection.

After final cotton taping has been applied, coil is thoroughly impregnated with insulating varnish, baked, and given a final, heavy coat of 1201 Glyptal Red. *This complete treatment cements the coils into a solid mass that offers high resistance to electrical breakdown or mechanical injury.*

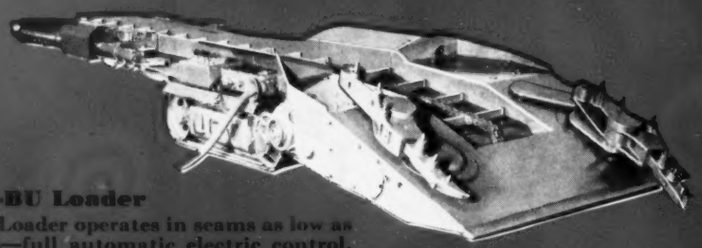
**50-hp motors and smaller*

JOY EQUIPMENT WILL ENABLE YOU TO MEET TODAY'S PRODUCTION DEMANDS!



★ **Joy 11-BU Loader**

This heavy duty, mobile loader is designed for fast loading in seams averaging 60 inches or more in thickness. Embodies all the latest mechanical and electrical improvements. An economical unit.



★ **Joy 14-BU Loader**

This Joy Loader operates in seams as low as 36 inches—full automatic electric control, individual motors for gathering arms, caterpillars and pump. A rugged, heavy duty machine. Loads up to 5 tons per minute.

Consult a Joy Engineer

PHONE • WRITE • WIRE

Joy 32" Shuttle Car

Ease of control, and extreme flexibility in operation—together with its abundant power, have made this unit a time and money saver wherever it has been used. Its use has cut overhead and increased output in many mines.

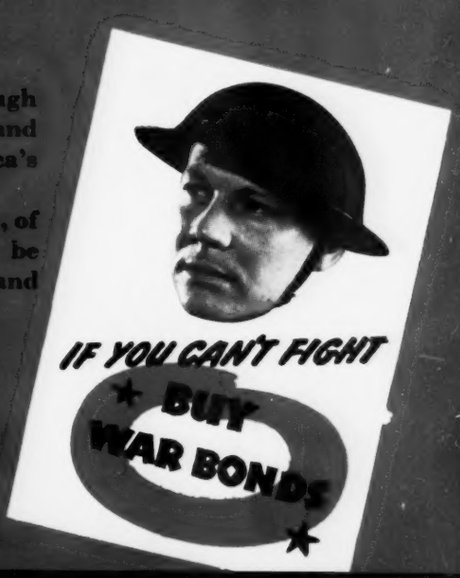
Joy 42" Shuttle Car

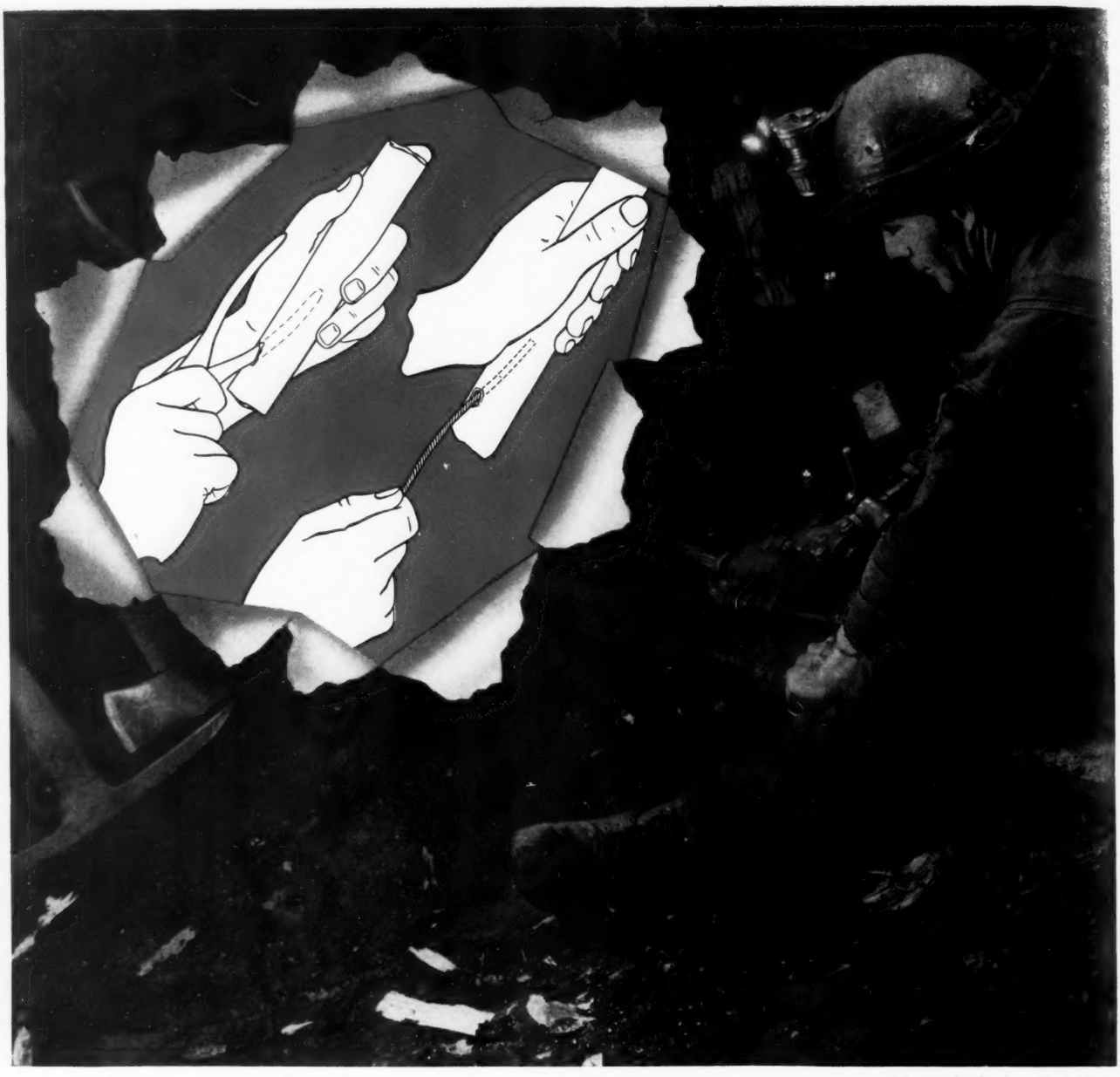
While the Shuttle Car is relatively new—its continued success and constantly expanding use, proves it does lower section handling costs and definitely increases mine output.

Joy Engineers have had a rather thorough and unique experience in advising and aiding in the mechanization of America's Coal Mines.

This basic and valuable knowledge is, of course, available to you and should be helpful in solving your problems and setting up your future plans.

JOY MANUFACTURING CO., FRANKLIN, PA.





Photograph taken in an iron mine

Aim Straight for the Center

When punching in through the side, locate the hole so that the detonating cap will rest *midway between the walls*—where it belongs! Guide the cap to a firm seating. See that it's held there by tying the fuse firmly to the side of the cartridge. Embedded in the heart of the cartridge, the cap is protected on all sides from impact and abrasion . . . either of which might cause a premature shot.

For better results in blasting, use Ensign-Bickford Safety Fuse. There's a brand designed to meet the conditions in your mine.

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ENSIGN-BICKFORD SAFETY FUSE

Machine Tool Builders . . .

the men behind our war production achievement

It took Germany six years to get ready for this war, and Japan even longer. But in less than twenty-four months American industry, starting from scratch, has caught up with and surpassed the war production of the Axis.

When France fell in June, 1940, we unfortunately had no gigantic munitions makers, like the Krupp or Skoda works, to turn to. We had been devoting our attention to making refrigerators and vacuum cleaners and motor cars and lawn mowers. Ordnance output for our Army was a mere million dollars a month. A sad commentary on our National state of mind and our lack of responsible political leadership.

Yet during June of this year, our industries, transformed from peacetime pursuits, produced close to a thousand times that amount. A thousand-fold increase in two years!

The same spectacular gains hold throughout our war program — for ships, planes, guns, tanks, a thousand items. We are well on our way toward the 60,000 planes, 20,000 anti-aircraft guns, 45,000 tanks and 8,000,000 tons of shipping that the President asked us to produce in 1942, and toward the much larger production projected for the year 1943.

We are well on our way thanks to a number of factors, one of the most vital being the extraordinary job done by the machine tool industry. For it has equipped America's metal-working shops with the tools they need to turn out the vast quantities of war weapons.

The machine tool industry's importance springs from the fact that almost every metal product, from mechanical pencils to giant guns, is made with machine tools. They transform pieces of steel into parts for automobiles, farm implements and radios — and for airplanes, guns and tanks.

The Garand rifle, highly praised by General MacArthur at Bataan, has 72 metal parts requiring 1040 separate cutting operations on machine tools. A 40-millimeter gun mount is made up of 1500 separate parts, built to the tolerance of a Swiss watch. Each part must be machined, not once, but several times.

No wonder that when the American defense program was undertaken two summers ago, the American machine tool industry was the first to be called into service. Ninety-five thousand machines were wanted as quickly as possible from 250 builders who in peacetime had produced some 25,000 machines a year.

But the demand did not stop there. The Army, the Navy and the Air Force kept asking for more as the war production program was expanded again and again. Nor was that all. The entire anti-Axis world besieged Washington with urgent requests — from London to Moscow, from Ottawa to Chungking.

To a man the machine tool builders responded. New factories and additions to old plants were built, with deliberate disregard of the prospect that all these sharply expanded facilities could not be used after the war.

To increase output from existing plants practically every company went to two long shifts or three short ones. The industry's work-week was greatly extended. From the beginning of our effort, it has been the longest of any industry.

Working forces were enlarged from 40,000 to 110,000, and this latter figure does not include tens of thousands of employees with sub-contracting firms. Though machine tool building requires a higher degree of individual skill than most products, "learner" courses have been set up to train men quickly. Over 15,000 men and women now are in training.

The machine tool builders were among the first to go in for sub-contracting. They have farmed out parts, subassemblies and complete

machines right and left. To meet their needs, for example, repair shops of carpet mills are making milling machines, a laundry machinery company is producing radial drills, and an automobile body builder is making planers and boring mills.

Machine tool manufacturers quickly shelved peacetime practices to concentrate manufacture on the sizes and types of machines critically needed for the war program. They adopted mass production methods wherever possible, although machine tools are essentially a tailor-made product. They sent their sales engineers, as did machine tool dealers also, to hundreds of munitions makers with invaluable advice as to tooling up most efficiently for their particular jobs.

The swift action taken by the machine tool builders shows what private enterprise can do to meet a national emergency. They were the first to institute a voluntary system of priorities.

All of this involved an almost explosive expansion of the industry. Machine tool builders produced an average of only 7,500 machines a year from 1931 to 1934. In an ordinary year, output totals 25,000 machines. But in 1940, it rose to 112,500, and in 1941 to 187,500.

The 95,000 machine tools wanted for the original defense program were built and delivered within eight months.

Today more than 1,000 machine tools are being shipped to war factories every twenty-four hours, and for seven days a week. Each month's output exceeds that of an entire normal peacetime year and is five times that of the depression year of 1932. And each succeeding month is shattering all previous records.

It is this amazing performance that led Under Secretary of War Robert P. Patterson to declare that "machine tools are the foundation on which our production structure is built. American machine tool men are doing a stupendous job. Machine tools are now being turned out at a rate of $1,380,000,000 a year. Machine tool designers have worked to improve tools so much that machine tool effectiveness today is one-third to one-half greater than it was in 1930. Our production today is 16 times what it was—in capacity to cut metal—at the peak of the World War."

The results of this performance by this key industry, so satisfying to the Nation, do not spring wholly from the numbers of machine tools produced. They stem also from their improved quality and greater productivity.

Today's warfare differs radically from that of 1917-1918. It calls for mechanized weapons so complicated in design and built to such a fine degree of accuracy that they are beyond comparison with the weapons of a generation ago.

Machine tools, completely redesigned during the depression years, are meeting these new and exacting requirements. In addition, thousands of machine tools of special design, without counterpart in peacetime work, have been built.

The record of the war industries most directly dependent on the machine tool industry speaks for itself. One tank manufacturer alone is producing more than thirty big tanks a day. A midwestern plant is completing 35 anti-aircraft guns a day, round the clock without interruption. A tank engine factory, tooled up to make 650 units a month, is actually building over 1500 a month. Demolition bombs, destined for Berlin and Tokyo, are being made by the tens of thousands every month. Machine guns are being produced at a rate of 50,000 a month.

These manufacturers, all machine tool users, are far in advance of the timetables set for them.

All this is good news for the American people and bad news for the Axis. It is proof that American industry, with each individual and specialized industry doing its part, is living up to the faith put in it by the American people.

But it is more than that, too. It is a guarantee of our confidence in the peacetime future of American industry and of the free enterprise system under which this miracle has been wrought.

Perhaps more than anything else, the foundation of that confidence must be faith in the farsightedness, the ingenuity, the engineering and designing skill, and the managerial know-how of the machine tool makers.

On them we depend for the most essential tools of the post-war production economy. Without them, our vision of better living standards and full employment through more efficient production and distribution can never be more than a vision.

What they have done as the toolmakers for war is proof of what they can do as the toolmakers of peace. How they have done it as free men is a demonstration of what free men will do.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

This message is appearing in all McGraw-Hill industrial and business publications, reaching over a million readers.

Coal Age

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SYDNEY A. HALE, Editor • AUGUST 1942

On the Right Track

COAL can take credit for the way in which it so far has filled demands for its product, despite growing difficulties, not the least of which is manpower. Manpower is now not only a question of numbers. It also is increasingly a question of individual performance, meaning that absenteeism for any reason whatever is a direct handicap to the war effort, along with failure to work as efficiently as possible while on the job.

The problem necessarily is one of cooperation. Among the responsibilities of the operator is the promotion of safe working conditions to prevent the injuries that cause a loss of working time, as well as the adoption of methods and equipment that will enable the miner to put forth his best efforts. As a corollary, the patriotic miner will keep himself safe, refrain from unnecessary layoffs and give his best while on the job.

That the seriousness of the problem has not yet been fully realized is the only conclusion, however, that can be drawn from reports of excessive absenteeism and failure to put on steam. How much is due to failure to acquaint the miner with the importance of his job is a question, but there is little doubt that it has been a factor. Hence, the growth in educational work by government officials, the union and the operators, all designed to show the miner how he fits into the war picture.

A cheering note is the growth in joint "Victory Production Committees" sponsored by the United Mine Workers in cooperation with producers, and in the educational measures being increasingly employed by individual producers and associations, including posters, recordings by government and union men and newspaper advertisements. Of vital importance, there is little question that this is a movement well deserving of whole-hearted support.

Well Only If Ends Well

AS IMPORTANT as research is the establishment of an organization to convert results into profitable utilization. If the steel, electrical and chemical companies that spent many millions on research had not followed up their discoveries and data sheets by sales efforts, their expenditures would have been a criminal waste of their stockholders' money. Instead, they are spending heavily on research but even more on sales.

Much of the research work of colleges and industrial organizations has been almost nullified by the lack of either money or of a desire to spend it in selling the findings whether as equipment or as usable information. Any research organization that finds its findings are allowed to die from a lack of commercial follow-up can be assured that no matter how important those findings may be, it soon will find itself without funds to continue the research.

Troubled Oil

AN OIL shortage in the East appears inevitable this coming winter, while coal itself may be in short supply not only in that region but elsewhere in the country should the expected transportation squeeze develop. Although ability to mine coal has not as yet suffered alarmingly, it must be conceded that there will be little reserve to meet sharp peaks even if transportation is available. The remedies—convert from oil, buy and stock coal now—have been clearly foreseen and strongly advocated for months.

Available evidence indicates that progress has been made in stimulating buying and stocking of coal, although neither is yet considered fully satisfactory. The conversion record, however, is spotty and on the whole not good, while little time is left to make an improvement.

Industrial consumers, who in some respects have much more at stake, appear to have been more active in converting from oil to coal, especially where such conversion could be accomplished without the use of large quantities of new materials. Household and commercial consumers, however, appear willing to take a chance, and so far few seem to have seriously considered changing to solid fuel even where such change could be accomplished with practically no new equipment and only a nominal expenditure.

Does this situation arise from a lack of conversion or auxiliary heating equipment? The answer in general is no, although it is definite that substitution of a coal-burning furnace or boiler for a serviceable oil installation is prohibited. Does it arise from a lack of action by coal producers and retailers? Again the answer is no, although some qualification perhaps is necessary, as coal men also have suffered, among other things, from lack of a definite outline of the part they should play. Despite this, work has been done. Anthracite operators, especially, have been active in bringing home to the public the importance of conversion, and in assuring supplies of conversion equipment, even to the extent of designing special grates

and making arrangements for their manufacture.

Assuming these conclusions to be substantially correct, to what, then, can public indifference to conversion be ascribed? The warnings certainly have been in time. But confusion engendered by conflicting or too-optimistic statements as to the possibilities of increasing oil flow seem to have largely nullified the effects of such warnings.

The solution, it seems, must await definite action by the government and other responsible authorities both to eliminate confusion and develop a definite plan of action on which foundation the efforts of industry can be superimposed. Meantime, in the short time left this fall, the course of the industry would seem to be to press for the adoption of the necessary definite government program, intensify its own work in awakening the consumer and making sure that the equipment he will need is available, and to get ready, as far as possible, for the demand peak that probably will come before the end of the year.

The Unwritten Editorial

MANY editorials remain unwritten for lack of information. Timeliness, and a need to inform the public of a sad state of affairs is present, but editorial comment is precluded. This editorial was to be written on the lumber industry based on "Accident Facts — 1942 Edition," National Safety Council, although there are other industries that might serve equally well as subjects. The lumber industry, says that brochure, had a frequency of 52.45 disabling injuries per million man-hours as against 38.90 in the mining industry. The record of the mining industry in severity is not as good—9.42 days lost per thousand man-hours against 5.19 in the lumber industry.

Unfortunately, the book has nothing to say about the number of fatalities in the lumber business or the change in rate per million man-hours. The lumber industry escapes public condemnation because the facts are not available and because the men drop off one by one and not in a group. Only group stories of industrial accidents are news, as every scribe knows. Coal mines have disasters which make the front pages and complete accident statistics are kept, so the coal industry continues to get unfavorable publicity. Yet in 1941 the fatality rate in coal mining per million tons mined declined 17 percent, but in twelve states the death toll from occupational accidents in all industries in 1941 showed increases ranging from 25 to 77 percent.

The size of the coal industry and propaganda by labor and other interests with axes to grind have obscured the immense amount of good work that has been done, although it is granted that there is room for further progress. Emphasis is placed on disasters but nothing is said about the large expenditures made to keep the accident record moving steadily downward. Perhaps coal, like other industries, could profit by a press agent.

Two Good Moves

WHEN a step not only helps the individual or company in its activities but also promotes a vital cause —and none is more vital than winning the war—it is doubly worth while taking. Recent weeks have brought to the fore two proposals which merit the active support of the coal industry.

Greater working safety to reduce the national economic loss from accidents, which also take their toll of the war effort, is the objective of one proposal. It goes without saying that safety is well to the fore in the thinking of coal men but it also must be conceded that there is room for improvement. One organization which stands ready to lend its help is the National Safety Council, which is appealing for $5,000,000 to promote a broad safety program in the coming two years. The Council's past record, if nothing else, is sufficient evidence that the drive is one that can be supported wholeheartedly.

"Get in the scrap" has been a long-standing slogan of the War Production Board. Now, leading industries have embarked on a campaign to promote the salvage of vital metals and materials throughout the length and breadth of the land, and are using the radio, newspapers and other advertising media to bring home the importance of conservation and salvage. War is calling for more and more scrap materials. There should be no question about the response of the coal industry.

Storage at Market

MUCH wanted is a safe way to store coal so that it will not catch fire or deteriorate. Fine coal can be compacted by rolling so that air cannot pass through it, but larger coal cannot thus be treated. It is said that surrounding the pile by a wall or a close fence is a solution, but few know about that method and it is inadequately documented. Some national authority should investigate the matter in several coal fields so as to give the public the benefit of the final word. Perhaps continuous water sprays, such as are used on burning rock dumps and waste piles in Great Britain, would prevent spontaneous combustion.

It seems that with all the menaces of inadequate transportation, less coal is being stored at the point of use than should be. The consuming industries and the public, despite pressure of governmental agencies, seem content to rely on the ability of the coal industry to meet any peak of demand, an assurance for which there is no warrant.

Salute

ORGANIZATIONS that can look back on 25 years of service are not few yet they are not innumerable. The National Coal Association therefore can take pride in the fact that in this year of 1942 it has completed a quarter of a century as an active agent in promoting the welfare of the bituminous industry. Born out of the needs of an older period of trial and uncertainty, its record provides ample evidence that it can function even more efficiently in the critical days to come. A salute, therefore, to the National Coal Association.

Coal Age *Editors look at the News*

★

Oil Situation Grows More Critical; Conversion and Coal Use Pushed

Coal Stocks and Deliveries Rise but Progress Still Is Considered Unsatisfactory—Measures to Increase Overland Oil Flow Pressed—Anthracite Issues Conversion Instructions—Steps Taken to Promote Barge Shipping of Coal—Return-Load Trucking Requirements Cancelled.

GOVERNMENT agencies and coal men continued to hammer on the importance of conversion and stocking of coal during July, while still further measures were taken to assure an adequate supply of fuel oil for those consumers who must continue to use it, especially along the east coast. The month also was marked by further efforts directed toward adequate transportation for coal and other solid fuels.

Stocks Building Up

With bituminous production running well over 11,000,000 tons per week, except for the July 4 vacation period, and anthracite operators turning out in recent weeks more than a million tons of commercial coal, progress was being made in filling up stockpiles and consumers' bins, although the rate still was not considered satisfactory in most quarters, despite the fact that retail deliveries of bituminous coal, according to reports by the Bituminous Coal Division, totaled 52,890,000 tons in the first five months of this year, against 42,300,000 tons in the same period in 1941.

Stocks of bituminous coal in the hands of industrial consumers and retailers began to show a moderate rise about the end of the first half of 1942, the monthly totals standing at the following: Jan. 1, 62,737,000 tons; Feb. 1, 58,681,000; March 1, 56,885,000; April 1, 57,221,000; May 1, 61,836,000; June 1, 67,409,000 tons. The figures in 1941 were: Jan. 1, 50,998,000 tons; Feb. 1, 48,702,000; March 1, 48,518,000; April 1, 50,690,000; May 1, 35,971,000; June 1, 37,483,000 tons.

Anthracite stocks held by electric utilities showed little change in the first five months of 1942, while railroad stocks apparently tended to decline, compared with a rise in the holdings of other industrials. Perhaps representing increased purchases by domestic users and other consumers, stocks held by a selected list of dealers dropped approximately 200,000 tons, while coal in producers' storage yards declined approximately 1,000,000 tons.

One feature in anthracite activities has been an increase in truck shipments, excluding stolen coal, of 22.1 percent in the first five months of this year as compared to the same period last. The increase in rail shipments was 13.7 percent, according to the Pennsylvania Department of Mines, while the over-all increase was 14.8 percent.

Critical Areas Added

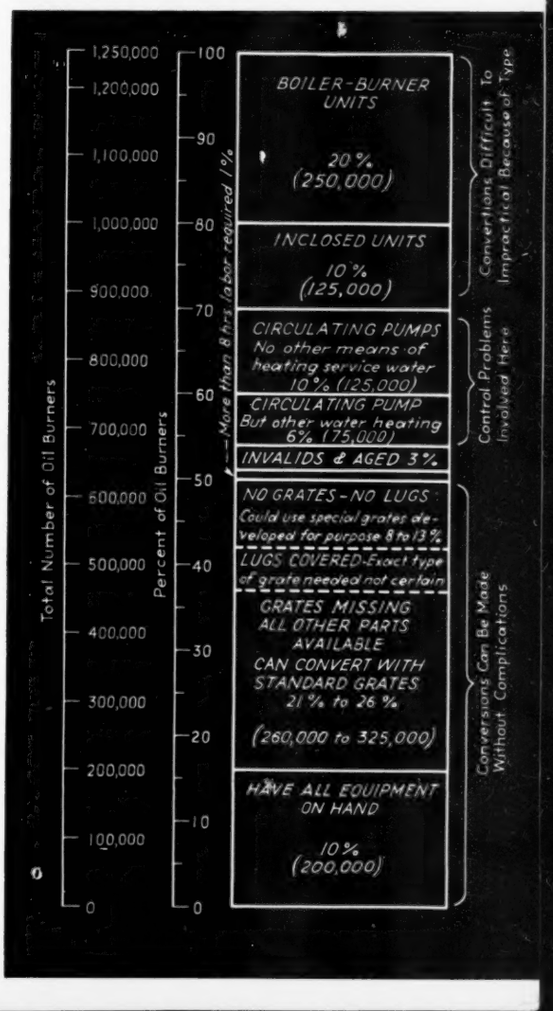
The Middle West and Washington and Oregon were added to New England and other localities as critical areas as far as coal supply is concerned in an announcement by Secretary of the Interior Ickes early in July. With other government officials and agencies, he reiterated previous statements that coal must be ordered and stocked now, especially in view of a report which he stated showed that railroad engines and cars would be short by the time the coal-burning season started.

Coal dealers in the smaller communities now are in the best spot to help in the movement, declared Luther Harr, Bituminous Coal Consumers' Counsel, as much progress has been made in the larger cities. Early cutting of wood in rural areas where available and can be substituted was advocated by Howard A. Gray, acting director, Office of Solids Fuels Coordinator for War.

(*Turn to page* 96)

Anthracite Industries Conversion Chart

Prepared by the Anthracite Industries Laboratory on the basis of 1,000 inspections in a second convertibility survey, this chart shows the relative ease of converting oil-burner installations. As the chart was calculated progressively from the top down, the sections are not interchangeable without recalculation. Example: Considerably more than 16 percent own grates, but after all classes above this are removed, 16 percent remains in which this is the only factor affecting conversion.



Government Takes Over Control Of British Coal Industry

National Board Set Up—Coal Mining to Be Added to Priority Industries That May Be Chosen in Lieu of Military Duty—No More Ex-Miners to Be Withdrawn From Army for Building Up Forces in the Mines.

CONTROL of coal production and consumption in Great Britain has been taken over by the British Government, which also plans reorganization of the coal industry to obtain increased production. The plan is described in a White Paper (Cmd. 6364) issued June 3. To carry out the government's proposals a Ministry of Fuel, Light and Power was set up on June 4 headed by Major Gwilym Lloyd George, M.P. The ministry will take over the functions previously performed by the Mines Department, bringing under direct control of a single minister of cabinet rank the functions of government in relation to the production and consumption of fuel and power, which hitherto had been divided.

Production Down

In presenting the proposals, the government points out that because of the expansion of war production and other war-time causes the demand for coal continues to increase, in spite of which the output shows a tendency to decline. With the prevailing rate of production not yielding enough coal to cover unrestricted domestic and industrial demands it was considered necessary that immediate steps be taken to increase output and eliminate unnecessary consumption of coal.

The government's plan includes the following proposals:

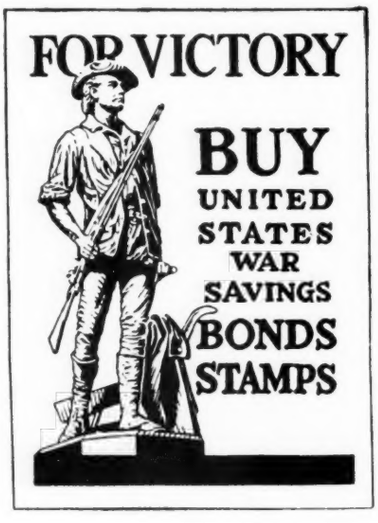
1. The government to take full control over the operation of all coal mines and the allocation of the coal mined, the responsible minister to exercise this control with a view to insuring maximum production for war-time needs.

It has been decided to organize the industry on the basis of national service, the new arrangement to continue pending a final decision by Parliament on the future of the industry.

The Minister of Fuel will be assisted by a Controller General, who will have as his chief officers a Production Director, responsible for efficiency and volume of production; a Labor Director, responsible for welfare, safety, health and working conditions of coal miners and allocation of labor; a Services Director, responsible for distribution and allocation of coal; and a Finance Director, responsible for all financial arrangements, including advice on coal prices.

2. A National Coal Board will be established to meet under the chairmanship of the Fuel Minister and consisting of the following members appointed by him: the Controller General (vice chairman), the vice chairmen of regional coal boards to be set up, a number of pit managers and colliery technicians, distribution representatives, and consumer representatives.

3. A Controller will be appointed in each region, to whom will be delegated the Minister's powers to control colliery undertakings and give directions to the management; these regional controllers, advised and assisted by the regional boards, to have full responsibility for the conduct of mining operations in their regions.



4. Coal mining will be added to the list of priority industries which may be chosen in preference to military service.

5. Measures to improve conditions for recruiting boys and youths into the coal industry are to be further considered as soon as the report of a committee now considering the subject is available.

6. A medical consultative service for the mines is to be established. This is designed to check wastage of labor by cutting down releases on medical grounds.

7. No more ex-miners are to be withdrawn, at this stage of the war, from the armed forces for work in the mines.

Committees to Assist

8. Pit production committees are to continue, as at present constituted, to assist pit managers to obtain maximum output. They will be relieved of all responsibility for dealing with individual cases of absenteeism, thus being free to devote their full attention to matters associated with production.

9. Absentees are to be dealt with in future by regional investigation officers appointed by the Fuel Minister; this officer to have power to recommend prosecution, which will then be the responsibility of the National Service Officer.

10. The National Coal Board is not to be concerned with wage questions, but a system is to be developed for dealing, on a national basis and by a properly constituted national body, with questions of wages and conditions in the mining industry; the government to discuss this with both sides of the industry.

11. Any other questions of detail connected with these proposals which either side of the industry may wish to raise is to be further examined by the government.

12. Industrial consumption of coal is to be reduced through: (*a*) improved methods of consumption, and (*b*) an organized system of allocating coal to industry.

13. All necessary administrative preparations are to be made for the rationing of domestic fuel at short notice in accordance with a scheme set out in an annex, but rationing is not to be imposed immediately until a further opportunity has been given to increase production and to effect voluntary reduction of consumption through a sustained publicity campaign.

14. The present system of restriction of deliveries of solid fuel is to be maintained, available supplies to be distributed between merchants roughly in accordance with the number of their registered customers, and merchants to be required to keep records of all deliveries so as to enable local fuel overseers to check the quantities supplied to different customers.

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400 Mines Inspected By Federal Force

"Federal coal-mine inspectors began their inspections of coal mines the week of Dec. 1, 1942, and up to July 1 of this year 400 of the larger mines in 20 states have been visited," observes Allen Sherman, chief, division of information, U. S. Bureau of Mines, in a statement to *Coal Age*. "These mines represent 16 percent of the larger mines of the nation—mines which employ more than 25 persons each.

"The 400 mines inspected represent a gross annual output of about 138,000,000 tons, or 24.7 percent of the total 1941 production of 557,000,000 tons by the estimated 14,000 coal mines in the United States. The 400 mines inspected employed 117,346 persons, or 21.9 percent of the total of 537,000 persons working in the coal-mining industry during 1941.

"There are now 101 inspectors, four mining-electrical engineers and two mining-explosives engineers in the field. The total authorized field force of 107 inspectors will be complete by Aug. 7, when six inspectors now training at Pittsburgh, Pa., are sent to the district offices of the Bureau for assignment.

"In addition to their regular inspection duties, federal coal-mine inspectors also have investigated six disasters in which a total of 123 men were killed. One mining-explosives engineer is conducting a special field investigation in Pennsylvania and West Virginia in efforts to determine a satisfactory method of preventing Cardox shells from being projected from boreholes. One inspector has begun a special study of the use of trailing cables in coal mines in efforts to minimize ignition hazards. Mining-electrical engineers, at the request of a mine operator, made detailed studies of the use of electrical equipment in several coal mines in an effort to determine ways and means of minimizing ignition hazards.

"The states or fields already represented in the inspection program and the number of mines which have been inspected in each, as of July 1, 1942, are: western Pennsylvania, 83; Pennsylvania anthracite, 28; West Virginia, 94; Maryland, 3; Ohio, 36; Kentucky, 27; Virginia, 8; Alabama, 23; Tennessee, 6; Indiana, 6; Illinois, 39; Missouri, 2; Michigan, 3; Arkansas, 1; Oklahoma, 5; Kansas, 1; Utah, 8; Wyoming, 7; Colorado, 14; New Mexico, 5; Washington, 1."

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5c. Freight Tax Asked; Depletion Election Allowed

After a stormy career in the Ways and Means Committee, the new 1942 tax bill was reported to the House July 15. As it stands it is expected to yield a revenue of $6,114,000,000, against a Treasury goal of $8,700,000,000. While amendments were permitted only through the committee and debate was expected to last but a few days, indications were that the measure would not finally pass until August at the earliest, with the possibilities as September or later. Both the President and Senate members were reported dissatisfied over certain provisions and omissions, and indications were that the bill would be subject to long hearings and considerable debate in the Senate.

Among the provisions of the bill is a 5-percent tax on transportation of property by rail, motor vehicle, water or air between points in the United States, except in the case of coal. This proposal originally was extended to coal also, but was changed to 5c. per long ton upon representations from the industry, consumers and other interests.

Coal also was successful in its campaign for retention of the percentage depletion provisions first adopted in the Revenue Act of 1926. Rates in the present bill remain the same, but a new provision was made permitting annual election of either the percentage or cost basis, whichever gives the greater reduction, in computing depletion.

Regulations Revised

Other provisions include effectuation of the policy that income received after the close of the previous calendar year should be taxed at the same rate to all taxpayers, regardless of the accounting period employed; permission to use consolidated returns for normal and surtax purposes as well as excess profits tax, conditioned on certain adjustments in the tax rate and restrictions on exemptions for purposes of the excess profits tax; provision for annual declaration of capital-stock value for the purposes of the capital-stock tax and the declared-value excess profits tax; restriction of capital gains and losses to two classes; and provisions to facilitate general relief.

The new bill also changes both the basis and the rates of the corporation income tax, as well as the method of computing the excess profits tax by dividing the income into two portions, one subject to the excess profits tax alone and the other subject only to normal tax and surtax. The rate on corporation surtax incomes of not more than $25,000 is fixed at 10 percent, with a graduated scale up to $50,000, over which the rate is 21 percent. The excess profits tax under the new bill is 90 percent (now 35 to 65 percent). The specific exemption for excess profits tax purposes is raised from $5,000 to $10,000. Credit on invested capital of from $10,000,000 to $200,000,000 is reduced from 7 to 6 percent; over $200,000,000, from 7 to 5 percent.

Begin $5,000,000 Drive For Safety Program

Confronted with a national economic loss, due to accidents, that last year reached a total of $3,750,000,000, business men and industrial leaders throughout the nation are cooperating in a drive to raise $5,000,000 needed to promote a broad safety program for the next two years.

Recognizing that the reduction of interruptions of war production caused by accidents is now both a national necessity and a patriotic responsibility, a group, headed by W. A. Irvin, former president of the United States Steel Corporation, acting with the expressed approval of President Roosevelt and Donald Nelson, chairman of the War Production Board, has organized the War Production Fund to Conserve Man Power.

This group, with headquarters at 71 Broadway, New York City, has started the drive for funds in forty major industrial divisions to enable the National Safety Council, a nonprofit organization, to enlarge the scope of its accident prevention program in a larger number of industries, instead of the relatively few now enjoying the benefits.

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Bureau of Mines to Study Liquid Fuel From Coal

Investigation of practical and economical methods for producing liquid motor fuels and lubricants from coal will be undertaken in Pittsburgh by the U. S. Bureau of Mines as soon as a new experimental plant just authorized by Congress can be erected and equipped adjacent to the Bureau's Central Experiment Station, according to an announcement July 10 by Dr. R. R. Sayers, Director of the Bureau. An appropriation of $85,000 is available for the project.

A study will be made of the Fischer-Tropsch method, a direct process for production of motor fuels from coal, with a view to developing means to produce gasoline from the coals of Alaska and the United States. Dr. Sayers advised Harold L. Ickes, Secretary of the Interior. Another method, a modification of the Bergius hydrogenation process, has been studied by Bureau chemists for several years.

"It is essential that steps be taken to provide for future needs, such as supplying gasoline to air bases in Alaska and other remote outposts," Dr. Sayers said. "The new appropriation of about $85,000 will enable the Bureau of Mines to establish a nucleus of men trained in the intricacies of the process who could assist or direct its industrial application wherever needed."

The experimental plant will have a capacity of about 100 lb. of gasoline per day and will include chemical engineering equipment.

Expansion of the Bureau of Mines field and laboratory work, to establish the possibility of increased domestic production of strategic and essential minerals, announced by Secretary Ickes, contemplates an investigation of deposits of coking coal in Wyoming and New Mexico, in addition to that now in progress on Utah coals.

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Industrialists Cooperate In Scrap Drive

Formation of the American Industries Salvage Committee, representing groups of leading industrial concerns working with the Conservation Division of the War Production Board to help speed the collection of vital scrap materials, has been announced by Robert W. Wolcott, chairman of the group and president, Lukens Steel Co. Other members of the committee directing the nationwide $2,000,000 campaign are: Charles R. Hook, president, American Rolling Mill Company, vice chairman; R. S. Wilson, representing the Rubber Manufacturers' Association; and O. E. Mount, Steel Founders' Society of America.

The work of the committee, backing up a broad advertising program, will be twofold: (1) to reach every manufacturing and business firm in the nation to impress upon them the absolute necessity of getting their scrap on the way to the production line; and (2) to get business men cooperating with the local salvage WPB committees already set up in 12,000 communities.

The activities of the committee will be closely coordinated with the present intensified scrap collection drive of the WPB, according to Mr. Wolcott. In this connection, the committee is underwriting the cost of an extensive national advertising campaign approved by the WPB, with a number of major industries underwriting the costs.

The advertising being carried on in newspapers, magazines, farm and trade papers and on the air focuses the spotlight of public attention upon the need for iron and steel scrap, non-ferrous metals, rags, burlap, rubber, tin cans (in some localities), and waste cooking fats.

Direct Appeals Used

Supplementing contacts with industry already established by the Industrial Salvage Division of WPB, the American Industries Salvage Committee will make a direct approach to individual industrial concerns, working through industry chairmen who are now being appointed. Leaders in fifty industries are being asked to serve as chairmen for their respective trades in a broad effort to see that every company appoints a salvage manager with authority not only to clean out production scrap but also to junk obsolescent equipment and the like.

The great task faced by American industry in meeting the expanding war-production program, Mr. Wolcott said, makes it necessary for each company to intensify its scrap-collection efforts.

"Our committee, through the leaders which it is appointing in each trade, intends to obtain assistance for the WPB's drive in as many companies as we can reach. We hope to release for war use unusual sources of scrap which may have been largely untapped, such as obsolescent machinery, unused dies and jigs, and other types of idle plant equipment. By carrying out this campaign on an industry-by-industry and company-by-company basis, we feel that we can gear the effort to the individual trade's scrap possibilities."

Coal's Manpower Problem Increases; Steady Work Urged on Miners

Manpower Commission Starts Preparations for Filling Essential Jobs—Fines and Vacation Controversy Cut Southern Appalachian Output—Union and Operators Urge Steady Work and Maximum Output.

MANPOWER considerations in coal mining moved further into the spotlight in July, also marked by increased pressure to check mounting absenteeism. On the national front, U. S. agencies concerned with various aspects of manpower were given specific tasks in eight directives issued June 25 by War Manpower Commissioner Paul V. McNutt. The directives were designed to insure that the employer doing the most important war job would have first claim on workers. Compliance on the part of the employer so far is voluntary, with the inference that compulsion will be adopted in freezing or transferring workers if the need should arise.

Draft Guide Issued

New guides for the operations of local Selective Boards issued last month are based on calling up married men last, taking single war workers before married men. Thirty-four activities were listed as essential in the war effort, including coal mining. More specifically, coal mining was defined as taking in anthracite, bituminous, semi-anthracite, lignite and peat, the operation of breakers and preparation plants and the removal of overburden and other activities preparatory to mining.

Operations of the Selective Service and the inroads of competing war industries continued to plague coal companies, however, with absenteeism a growing factor (see also report of meeting of the A.I.M.E. Central Appalachian Section, elsewhere in this issue). That Selective Service still adheres substantially to its original principles as far as coal mining goes was again brought out at a conference in Salt Lake City, Utah, last month to canvass the problem of supplying men to operate the State's growing producing facilities. Operators stressed the fact that more men must be found, while the Utah Selective Service Director stated that although his agency wanted to cooperate it still was charged with supplying the necessary men for the armed forces. Before housing can be supplied for additional men, declared the Utah FHA director, the coal miner must be declared a critical war worker.

The anthracite region was short 4,293 miners on March 31 and the shortage has increased since that time, declared Donald M. Nelson, WPB chairman, July 24, in appealing to both anthracite labor and management for higher production, formation of labor-management committees and reduction of absenteeism. Four meetings to get the program under way were held in Scranton, Wilkes-Barre, Pottsville and Hazleton in July.

In addition to other factors hampering production, a temporary complication in July was the vacation controversy in the southern Appalachian region, declared to be responsible for a substantial loss of tonnage before administration intervention brought about a settlement June 29—not in time, how-

These Koppers Folks Are Fighting For YOU
LOOK for new FACES on this poster every MONDAY
BACK THEM UP!
DON'T MISS A SINGLE DAY'S WORK
BUY U. S. WAR BONDS & STAMPS

Backing up the Men on the Firing Line

Used by the Koppers Coal Division, Eastern Gas & Fuel Associates, this poster is an example of the steps being taken to point up the importance of coal in winning the war. A new poster of this type is posted each Monday at the company's mines in West Virginia, Pennsylvania and Kentucky, and the series, because of the great number of men joining the colors, probably will be continued a year or more. Nearest of kin of each man joining receives a framed photograph with a letter from L. C. Campbell, Koppers general manager of mines. "Back them up!" says each poster. "Don't miss a single day's work."

ever, to prevent most of the miners from starting on the 10-day vacation provided in the union agreement. Another attempt was made last month to settle the differences between Indiana operators and miners which twice this year resulted in complete shutdowns of the State's mechanical deep mines. Two members of a fact-finding panel named by Secretary of Labor Perkins awarded drillers and shotfirers a 40c.-a-day wage increase on July 16, with a third member dissenting. The increase was made retroactive to Jan. 1, 1942.

Insistence of the United Mine Workers on the return of fines which the union asserted had been illegally collected as a result of the 1941 captive-mine stoppage before a short-vacation agreement would be signed was responsible for the southern Appalachian imbroglio. At the request of the administration, the operators agreed to return the fines and such return before Aug. 1 was pledged by E. R. Burke, president, Southern Coal Producers' Association. Incidentally, steps towards the reestablishment of District 29 (June *Coal Age*, p. 42), with tentative headquarters at Beckley, W. Va., were largely completed by the union in July. Meanwhile, secessions from District 50 continued at an accelerated pace.

Steady Work Urged

Both the union and the operators strengthened appeals for steady work and higher production. Officers and members of all local unions were asked by John L. Lewis in a letter dated June 26 to see to it that absenteeism is reduced to the lowest possible figure, and that other necessary steps are taken to increase production. Progress in setting up "Victory Production Committees" suggested in the letter was marked in July. In central Pennsylvania, as an example, a central committee of two miners and two operators was organized and provisions were made for establishing smaller committees at each mine.

Posters, recordings (such as those used by the Pittsburgh Coal Co., June *Coal Age*, p. 40, since supplemented by recordings by other government and union officials) and other educational measures were used in increasing numbers to bring home to miners the importance of their job. In addition to many other operating companies and organizations, the Western Pennsylvania Coal Operators' Association inaugurated a series of posters entitled "Coal Goes to War" and backed them up with an advertising campaign in 20 newspapers. A similar campaign was started by the Virginia Coal Operators' Association and District 28, United Mine Workers, and work along the same lines was started in other regions, according to reports.

WPB Realigns for Production Task; Materials Scarcity Increases

DEVELOPMENTS on the equipment and materials front in late June and July included a reorganization of the War Production Board with emphasis on directing the flow of materials to sustain production, rather than in promoting curtailment and conversion to assure manufacture of war materials. William L. Batt becomes vice chairman of WPB as general assistant and deputy to Donald Nelson, and James S. Knowlson becomes vice chairman in Charge of Program Determinations. A third policy executive now is the Deputy Chairman on Program Progress. Under the realignment, the former industry and commodity divisions and regional offices now come under a Director General of Operations (Amory Houghton). He will exercise the priority powers formerly delegated to the Director of Industry Operations. Industry branches, it is stated, will be little affected by the new set-up in the WPB office.

Production of a maximum of 500 "off-the-highway" trucks, truck-trailers and trailers in the last six months of 1941 has been authorized. Otherwise, no trailer holding more than 10,000 lb. can be manufactured except for military, government or lease-lend use.

A fourth report on materials issued by the WPB Bureau of Industrial Conservation, conservation and substitution branch, included in Group 1 (inadequate supply for war and essential civilian uses and in many cases for war purposes alone), brass, bronze, copper, copper scrap, tungsten carbide, wrought iron, alloy and steel shell, steel plates, structural steel and steel piling, seamless steel tubing (4 in. and under), wire rope, tin plate, sheets and strip, wire products, black and terne plate, rails and reinforcing steel, semi-finished steel and forgings, tool-steel bars, pipe, jute, better grades of lumber, except white pines and gums, rubber, etc.

Good progress, however, was reported toward final approval of a WPB determination allocating materials to mining-machinery manufacturers for the third quarter. A sweeping revision of present price regulations covering machinery and parts, including broadening of controls to take in subassemblies and their components and machinery services, was included in an amended maximum price regulation, No. 136, issued by the OPA July 1. OPA also ruled that unpeeled logs sold for mine timber without processing are exempt from maximum-price regulations.

Later in the month, the WPB Mining Branch announced that repair-parts quotas for the third quarter already had been issued to a major portion of the coal and other mines eligible to apply the A-1-c rating set up under Order P-56. At the same time, the Mining Branch asked that mining steel-plate customers show on Form PD-298 the "5-E Mining" classification number under which the branch works so that orders could be readily located on the plate-mill schedules. Where use information is called for it should be supplied also. Continued efforts to allocate a fair share of steel-plate production for mining use was pledged by the branch.

THICK-COAL PILLARS

Mined With Mobile Loaders and Shakers

Extraction Increased From 25 to 30 to 80 to 85 Percent with Mechanical Equipment—Leaving Top Coal on Advance Essential—Also Systematic Working—Coal Thickness 16 to 17 Ft.—Pitch Approximately 10 Percent

By IVAN A. GIVEN
Associate Editor, Coal Age

PILLAR EXTRACTION with mechanical equipment is a much more difficult task where the coal is extra thick, as at the Kenilworth (Utah) mine of the Independent Coal & Coke Co., where the problem is further complicated by an average pitch of 10 percent. Despite this pitch and an average thickness of 16 to 17 ft., development of systematic pillar-recovery plans for both mobile loaders and shaker conveyors has resulted in an increase in extraction of from 25 to 30 percent to 80 to 85 percent, with coal from pillars now aggregating about 55 percent of the total output, compared to 7½ to 10 percent before the systematic plans were evolved.

Paul F. Keyser is president of the Independent Coal & Coke Co.; Sam Woodhead is secretary, treasurer and purchasing agent; and A. H. Jenkinson is sales manager. Consulting engineers are Leonard Wilson, electrical consultant, and E. H. Burdick, geological and mining engineer. All the preceding are of Salt Lake City. The operating and engineering force at the mine includes George B. Jackson, superintendent; Ray Robbins, chief engineer; W. C. Painter, master mechanic; Thomas Hughes, chief clerk; E. O. Jackson, mine foreman; Lawrence Berensen, night foreman; Sam Fratto, safety director; Art Jeanselme, assistant to the foreman in charge of conveyor mining; Don Newberry, shovel boss in charge of mobile loaders. Mr. Burdick and the members of the Geological Survey, consisting of Bert Dyer, district mining supervisor, and James McKim, deputy mining supervisor, and L. P. Pearce, then resident mining engineer of the company, worked out the original development plan, providing a system of advance work insuring an equal amount of coal left in solid pillars for production and maximum recovery on retreat.

Preliminary work in pillar extraction was done with shaker conveyors equipped with duckbills, starting in 1939. This equipment was chosen because, while it provided the advantages of machine loading, its use did not necessitate a great departure from previous hand-loading methods. However, it did permit the development of a sequence method of pillar mining and roof control which since has been found equally adaptable to use with crawler-type loading machines. It should not be inferred, however, that the organization has swung over to crawler equipment entirely in pillar extraction, as the management feels that under Kenilworth conditions there is a definite place for both, as well as for track-mounted loaders for development. Consequently, additional conveyor equipment is planned.

With both crawler loaders and shaker equipment, it is felt, an opportunity is afforded for making full use of crawler units where conditions are right. But if, as a territory is worked down, weight or other conditions should render the use of loaders less attractive, shaker equipment is available for completing it with high efficiency, as well as for production in its own right and for working sections where conditions make introduction of crawler equipment less desirable.

Among the principles to be followed in the extraction of pillars with all types of equipment discovered in the preliminary work with conveyors were the following: a systematic plan of attack; leaving the top coal in rooms and other openings until the final retreat; establishment of a break, or shear, line directly up and down the pitch; and systematic timbering, mainly for protection against coal jumping

Making a shear cut in a pillar place with a track-mounted machine, using water on the cutter bar. This one machine, unlike the others, is not now equipped with a mounted drill.

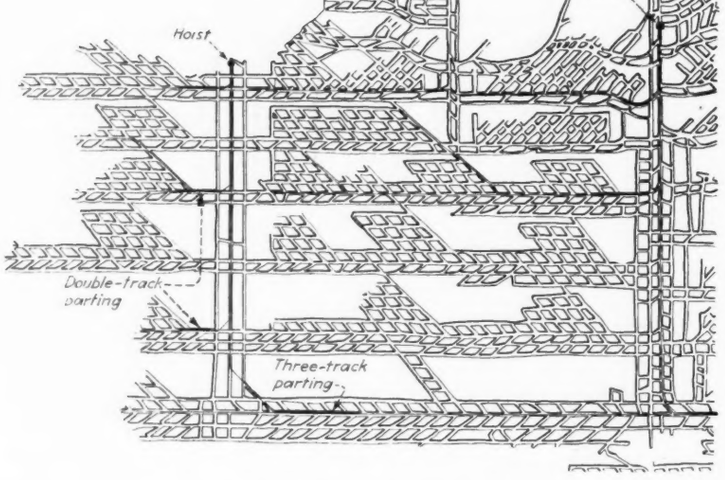


Fig. 1—General plan of operation and haulage at Kenilworth mine.

off the ribs on the upper sides of the places. It also was found that several adjacent entries could be worked, if desired, independently (or as individual pillaring districts) by staggering or stepping the break line.

Kenilworth production comes from the Kenilworth seam, with, as stated, an average thickness and dip of 16 to 17 ft. and 10 percent nearly due north, respectively. The property originally was opened on the outcrop with an outside tram line and an incline down to the preparation plant at the foot of the mountain. The present opening (driven in 1924) is a double-tracked rock tunnel 8,500 ft. long on a 1¾- to 2½-percent grade in favor of the loads. This tunnel connected into the Main East entry driven on the strike (N. 87 deg. 13 min. E.). Development both above and below is by means of inside slopes from which room entries are turned parallel with the Main East openings (Fig. 1).

Cover over the working sections varies from 700 to 1,400 ft. in thickness. Over the coal in some areas is a 1- to 2-ft. sandy shale followed by a 1- to 3-ft. rider seam and layers of laminated sandstone up to the massive Castle Gate sand, some 65 ft. over the coal. In areas where the sandy shale and rider are absent, the sandstone measures rest on top of the coal. In pillar extraction, the first major break in the measures usually occurs when the work has advanced some 125 ft. from the barrier or other limit. Observations indicate that initial caving extends up 50 to 60 ft., with secondary caving going up to 80 to 100 ft. before choking occurs and the action stops.

Drilling in a shaker-conveyor place with post equipment.

The floor is an oily shale and the seam is characterized by pronounced face cleats, or "slips," running S. 58 deg. 9 min. E. These cleats stand at an angle of about 70 deg. to the floor, leaning up the pitch, and tend to curl back at the top of the seam. Rooms normally are driven approximately S. 40 deg. E., thus angling across the slips on a course which gives the maximum protection against "unlocking" of the slips and consequent sloughing of the ribs.

Production equipment at the time this article was prepared consisted of six duckbill-equipped Goodman shaker conveyors (G-20 B-77 drives) and two Joy 11-BU loaders in pillar work, supplemented by track-mounted equipment for development and solid work as follows: one Goodman 260, one Jeffrey L-400 and one Jeffrey L-600, with a Goodman 460 on order. Average daily output with 230 men underground was running 3,000 tons per day (two underground shifts), with about one-fifth off the conveyors and the remainder off the loaders. Not all equipment was being worked a full two shifts a day when this article was written, at which time average conveyor-unit output was 140 tons (two conveyors, six-man crew). Average loader output (normally 17- to 18-man crews) was 380 tons per shift.

Cutter Accompanies Loader

Each loading machine is accompanied by a Sullivan 7-AU track-mounted cutting machine. All but one, scheduled for similar equipment in the near future, carry Sullivan CD-18 drills. Combination equipment was selected for Kenilworth conditions because room entries seldom provide more than eight to ten places, while attempts to use one cutting machine on two entries involves long tramming and the negotiation of steep slants, in addition to the interruption of the working cycle. Therefore, machines are kept on one entry and crews handle both the cutting and the drilling in a room-entry or development territory. The machines are equipped with 9-ft. bars using Bowdil or Cincinnati throwaway bits, a practice of several years' standing. Coalmaster conveyor-type augers and bits are employed. A pipeline with a spigot is laid into each working place, and hoses are supplied for running water onto the bar while cutting. Places also are wet down before shooting and before and during loading.

Each shaker conveyor is accompanied by a Jeffrey 35-B or BB shortwall with 7-ft. bar and a Chicago

Pneumatic post drill. Except on the night shift, when all men are out of the mine, shooting is done with Hercules Red H-B sheathed permissible, the sticks being inclosed in a sheath of sodium bicarbonate inside a cardboard cylinder. The sodium bicarbonate liberates water vapor and quenches the flame when the powder explodes. Sheathed explosives of the permissible type were approved for use on the working shift by the Utah Industrial Commission in 1940, following tests at Kenilworth and other properties. With the sheath, the cartridge diameter is $2\frac{1}{4}$ in. (stick size, $1\frac{1}{2}$x8 in.), and holes are drilled accordingly. Stemming and shooting practices will be detailed later in this article.

Leaving Top Coal Essential

Leaving top coal, as has been stated, has been found an essential item in efficient pillar removal at Kenilworth. Consequently, in all solid work (headings, rooms, slants, panels, crosscuts and crossovers) the practice is to drive about 10 ft. high, leaving 7 ft. of top coal for later recovery in conjunction with pillaring. The same practice also is followed in splitting, crosscutting, etc., in pillaring, as it keeps the pillars and stumps in better shape, shortens the length of posts required, and reduces sloughing of the ribs and faces. Where the top coal has been removed over large areas in driving rooms and other openings, squeezes, with their accompaniment of heavy bouncing, overhanging brows and sloughing, are much more likely to occur. As stated, about 7 ft. of coal is left, and in any event every effort is made to keep the thickness more than $2\frac{1}{2}$ ft., as less than that is considered dangerous.

Development in general is based on dividing the coal into blocks by slopes extending either up or down the pitch from the Main East entry, as shown in Fig. 1. Fig. 1 also illustrates how room entries are driven across the blocks from one slope to the next. Inside slopes are spaced far enough apart for a room-entry length of about 2,900 ft., sufficient, with allowance for barriers at either end, for about 20 rooms 22 ft. wide on 112-ft. centers (measured along the entry), plus three or four short rooms at the inby end of each entry. Room-entry development is based on studies made by Mr. Burdick and the U.S.G.S., and the length is determined by haulage considerations: i.e., the maximum distance gathering locomotives can tram economically from the inside end to the parting at the mouth.

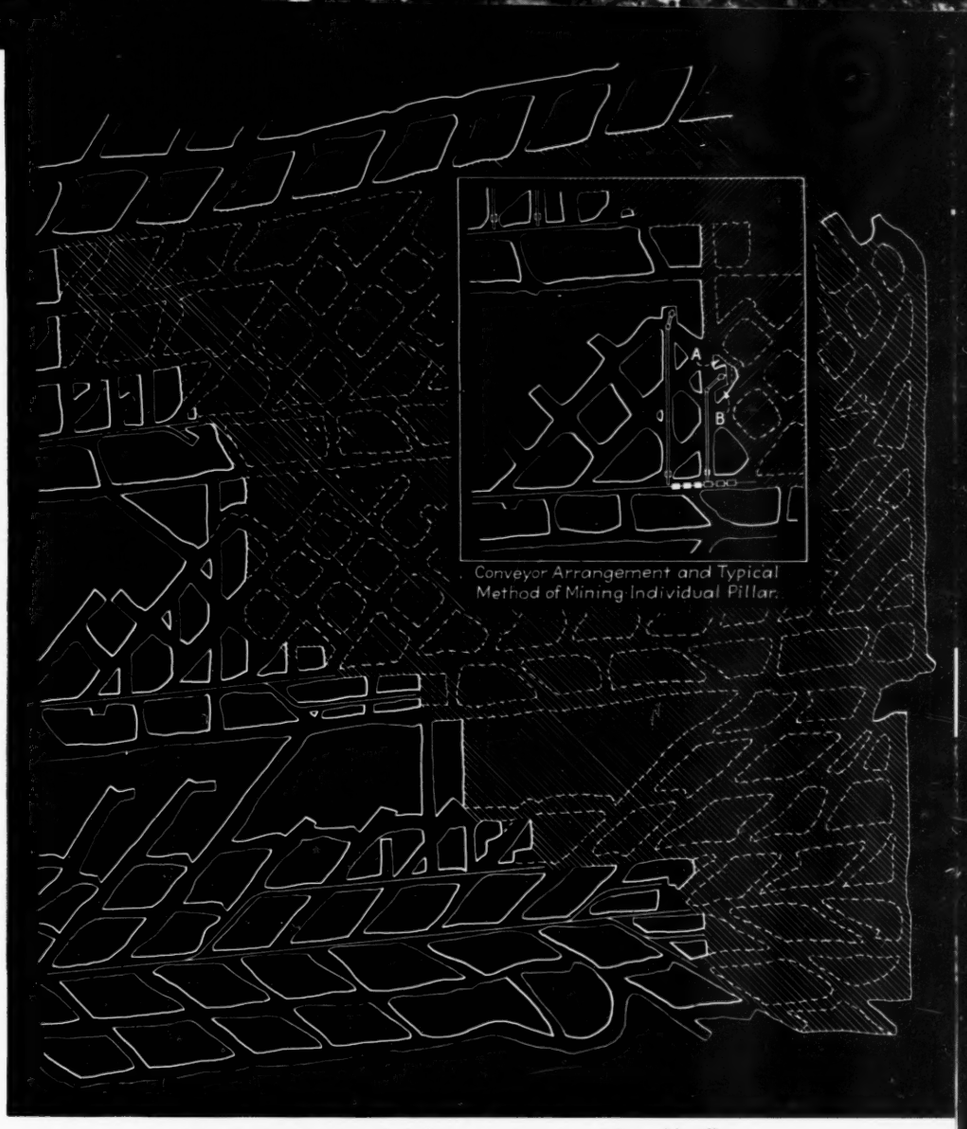


Fig. 2—Application of shaker conveyors to mining old pillars.

Cost of driving, laying track and installing other facilities for complete development and then full retreat work also dictated a combination of entry and room work on the advance, with final pillar extraction and completion of room work on the retreat. Under this system, as shown in Fig. 1, five rooms are driven as the entry is started, then five are skipped, followed by driving five more, etc. Track-mounted equipment is used in this and other development work for the reason, among others, that it synchronizes well with track-mounted cutting and shearing machines. With crews of 17 to 18 men, such track-mounted loaders were averaging around 400 tons per shift.

Much of the pillar extraction to date, however, has been in old territories, some of which were driven up by hand. Conveyors, as noted, were first applied to pillar extraction in 1939; in this case in such an old territory. The rooms were turned on 112-ft. centers and were driven up on an angle in accordance with standard practice to form approximately square pillars as shown in Fig. 2. Recovery is accomplished by cutting through the pillars straight up the pitch with the conveyors on 56-ft. centers, meaning that one drive is set in the original room neck and the other half way to the next. The work on one entry up the pitch is kept five places or so ahead of that on the entry below so that each is independent as far as roof-caving and other activities are concerned.

Two conveyors are worked as a unit on an entry, one driving up while the other is taking out pillars on the way back. Cutting, drilling, shooting, timbering, etc., are carried on in one place while loading goes on in the other. In driving up, the chain pillars on the upper entry are included, but not the stumps, which hitherto have been loaded, along with certain other pillars or stumps difficult to mine from the regular set-ups, by old-type utility, or spare, crawler-loader equipment. Elevating-conveyor equipment, however, is being acquired to permit laying back a conveyor or conveyors to mine the room stumps in old territories or both the stumps and chain pillars in new work.

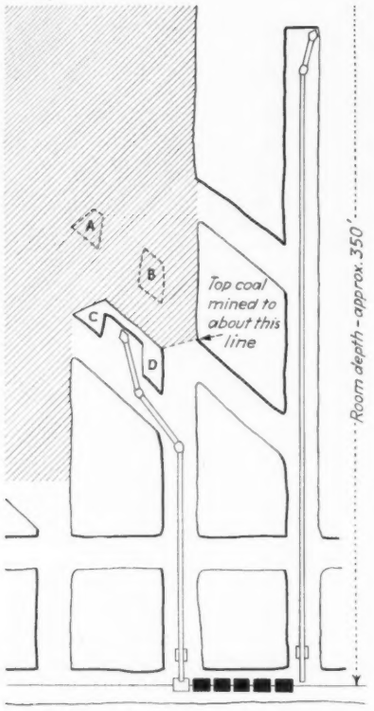


Fig. 3—Proposed plan of operation with shaker conveyors in new territories.

Methods of attacking individual pillars on the retreat are subject to variation depending upon their size and shape. One of the more common plans is shown in Fig. 2. It consists of splitting the roughly triangular remainder, leaving Stumps *A* and *B*. Then the top coal is shot down back to Stump *B* and loaded, after which *A* is shot and loaded and the top allowed to cave back to *B*. The top coal then is shot down back to the next pillar and loaded preparatory to taking out Stump *B*, and so on.

In new work, for which additional units have been ordered, the plan is expected to be substantially as in Fig. 3, with the haulage on the lower heading of the two, crosscuts as room necks and rooms driven straight up the pitch. The original plan of having one conveyor driving up a new place while the other is taking out pillars is retained, while stumps and chain pillars will be taken out by laying back the conveyors and using an elevator to place the coal in the cars.

Individual pillars will be mined by splitting them and then knocking off the triangular point next to the gob on the part or full pillar below. This is done, using a second swivel, because experience has shown that it is difficult to hold points sticking out in the gob. After knocking off the point, the part pillar above them is split about in the middle, leaving two stumps, such as *A* and *B*, Fig. 3. The top coal then is shot down around *A*, after which it also is shot and loaded. The process is repeated with Stump *B*, whereupon the conveyor is shortened and the next part pillar is split and worked down in the same fashion, using two swivels when required.

Conveyor units are served by trips of six cars, which are handled under the conveyor discharge (one or the other of the two conveyors) by a battery or cable-reel locomotive, one man on the crew overseeing loading and locomotive operation, in addition to pulling loaded trips to the parting and picking up empties. The trimmer also operates the conveyor in accordance with signals from the face. As stated, the crew for a two-conveyor unit is six men. Average unit output in old territories was running 140 tons per shift.

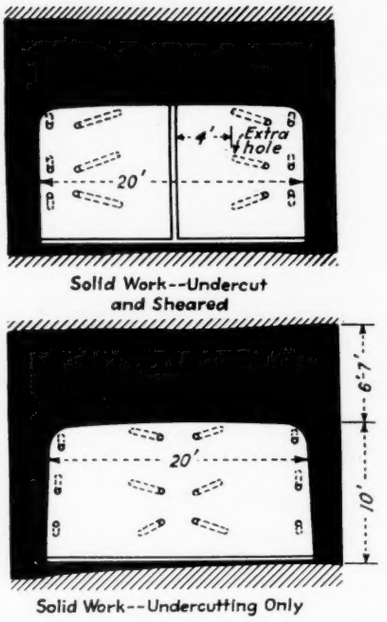
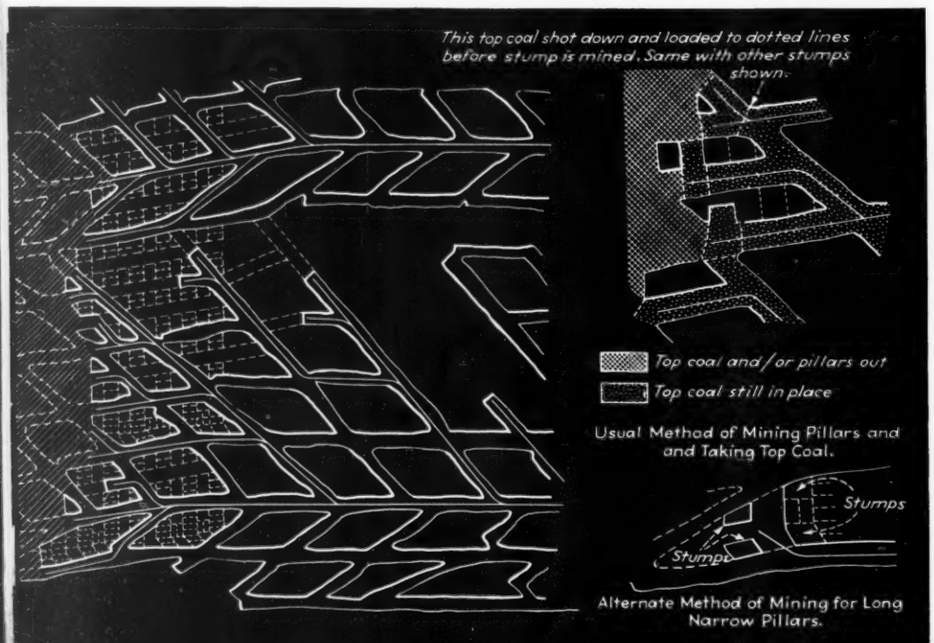


Fig. 5—Usual drilling patterns in solid work.

Pillar-extraction with crawler-mounted loaders started in the latter part of 1940 and was based on experience with shaker equipment. Crawler machines were adopted for this work because, among other things, in the opinion of the management, they could negotiate sharper turns and corners easier and could load stumps farther from the end of the track. As with shaker units, initial work was in an old territory with pillars of various shapes and sizes to work on. Accordingly, one of the first principles laid down for this work was systematic operation. Therefore, each pillar is studied by the engineering department and the exact number and sequence of cuts and stumps determined in relation to the desired breaklines and other pillars. Finally, breaklines, established every 36 ft. straight up and down the pitch, are marked on working maps and on the roof in working places as a guide in extraction work, and every attempt is made to insure a break on each line as the work comes back to it. In the example shown in Fig. 4, the line extends over three room entries, although not all are shown. As a natural accompaniment of the system, sights are set for driving splits and other major openings in pillaring, and stumps are shot and loaded clean to prevent interference with roof action. The shear, or break, line, it will be noted, runs generally straight up and down the pitch, which has been found the best direction for good caving and absence of weight or

Fig. 4—Method of mining old pillars with crawler loaders and mine cars.


This top coal shot down and loaded to dotted lines before stump is mined. Same with other stumps shown.
Top coal and/or pillars out
Top coal still in place
Usual Method of Mining Pillars and and Taking Top Coal.
Stumps
Stumps
Alternate Method of Mining for Long Narrow Pillars.

other effect on the pillars still standing.

Each entry, which is a section for a loading unit, normally provides from five to ten working places. Individual pillars, as shown in Fig. 4, normally are split along the strike by places 16 to 18 ft. wide. Then, the remaining two sections are mined by pocketing through them, shooting and loading top coal and shooting and loading the stumps next to the gob. Splits, pocket cuts and stumps, as noted, are laid out in advance, and are synchronized as between the various pillars so as to keep them fairly well abreast and on the desired break line. When a pocket, as shown in Fig. 4, is driven through, the practice is to shoot the top coal down back to the remaining portion of the pillar and load it out, after which the stump is shot and loaded. The roof then is allowed to cave to the break line in preparation for another cycle.

Pocketing Also Done

Splitting as a preliminary to pillar extraction is not an invariable practice, however, as against old works and also where the pillars are narrow the pocketing modification shown in Fig. 4 is employed. In this system, a pocket is driven up through the pillar, after which the section against the gob also is divided by pocketing, leaving two or more stumps against the gob. After removal of the top coal these stumps then are shot and loaded. Thus, the work, until the time for stump removal, always is behind solid coal, which also eliminates supporting a sloughing right rib. Pocketing up the pitch, however, is possible only where the grade is not too steep for the track-mounted cutters to tram up to the face.

Crews for crawler machines in pillar work are made up as follows, although when conditions warrant there are some deviations from this standard: one loader operator, one helper, one faceman, one clean-up man, two motormen, one nipper, three to four trackmen, two timbermen, two drillers and one machineman (working together), and one section foreman. Shotfirers are not included in the above, as they generally work over more than one section. In old territories, such crews were averaging 360 to 380 tons per shift at the time this article was prepared.

After the loading machine leaves the place the clean-up man comes in and gets it ready for subsequent operations. He is followed or accompanied

Loading holes in a pillar place. Inset is a close-up of the sheathed explosive used.

Duckbill at work in a pillar place.

Crawler loader starting a pocket in an old pillar. Note top coal still in place.

by the timbermen, who set such timber as is necessary, usually a minimum of a post about every other cut on the upper rib to hold it in place. Such posts are set with the top uphill so that they will be tightened automatically by any coal which may loosen at the top. The track then is extended and the place cut and drilled.

In conveyor sections, the cycle is substantially the same as in any other conveyor work. Shortwall cutters and post drills are employed, as compared with track equipment in the mobile-loader territories. Drilling patterns vary with the type and width of place, but some of the more common ones are given in Fig. 5—undercutting only and undercutting and shearing. Shearing is the normal practice where track-mounted cutters are employed, the shear being made in the center. In a 20-ft.-wide place 10 ft. high making about 55 to 60 tons cut 8 ft. deep, 10 to 11 holes usually are drilled. All holes must be at least 6 in. shorter than the depth of the cut and a foot in from the edge on each rib. Holes are stemmed to the collar with earth dummies, and are shot in two rounds, the first consisting of the bottom holes and the second the top two rows.

The same general pattern is followed in narrow (16-ft.-wide) places, including the extra hole on the tight side. In wide places where undercutting only is done, twelve holes usually are drilled from three set-ups, approximately as shown in Fig. 5. Drilling for shooting top coal is adjusted to conditions and consequently is subject to some variation. Production per pound of explosive, including shooting top coal, averaged 3.42 tons in April, 1942.

Mobile loaders are served by two 6- or 8-ton cable-reel locomotives. Car equipment consists of 165 Watt units with original capacities of 165 cu.ft., which have been augmented by 6-in. sideboards. These cars were built of copper-bearing steel. Besides those original cars, 84 205-cu.ft. Card cars are in service, with 30 more on order. All cars, both old and new, are equipped with Timken roller bearings and spring drawbars, with patented safety equipment on the draw ends for slope work. Wheel-tread widths have been changed from 3½ to 4 in., which has materially improved the derailment record.

In serving a loading machine, one of the two locomotives brings in a trip of about six cars, which it gets filled one by one, sticking the loads in the nearest available place, usually, in pillar work, the next track down the pitch. While this locomotive is getting its trip loaded, the other goes to the parting at the mouth of the entry.

Trips are handled between the Main East entry and the room entries by hoists at the tops of the slopes driven up and down the pitch from said Main East entry. Trolley locomotives handle trip movement from the Main East partings to the outside.

ALL-OUT FAN DRIVE

Tops Ventilation Work at Pursglove No. 15

More Air With One New Fan Compared With Two Old Ones—Power Savings Alone Will Return Investment in Eight to Nine Years—Motors and Controls Duplicated for Uninterrupted Service to the Mine at All Times.

RECOGNIZING ventilation as a "first" in efficiency and safety in present operations and in successful planning of future development, executives and engineers of the Pursglove Coal Mining Co. have just completed a $50,000 ventilation improvement at No. 15 mine, Pursglove, W. Va. It includes a two-motor fan drive with free-wheeling clutch and automatic electrical controls which in combination go all the way in insuring continuous operation. Sinking a third air shaft and installation of a new fan with higher efficiency to replace two old fans is effecting a power saving which alone will return the whole investment in eight to nine years. This ventilation job, in the words of Joseph Pursglove Jr., general manager, was done at this time "to improve ventilation, reduce ventilating cost and take care of future necessities as development continues."

No. 15 mine, on Scotts Run in Monongalia County, northern West Virginia, is an old operation in the Pittsburgh seam, averaging 84 in. in thickness and producing a considerable quantity of methane. At the present rate of production, 3,500 tons per three-shift day, the probable life is twenty-five years. In 1941 the production was 750,000 tons and in 1942 the expected tonnage is 850,000. Cover ranges from 70 ft. at the conveyor slope feeding the preparation plant to 550 ft. at the back end of the property. A drift entry with the portal 2,000 ft. down the creek from the plant serves as a man and material opening. All the coal is loaded by mobile machines.

Depth of the new air shaft is 320 ft. It is concreted all the way down and the finished internal diameter is 14 ft. The new fan, installed at the top of this shaft, is a Jeffrey 8-ft. Aerodyne (SKF roller bearings)

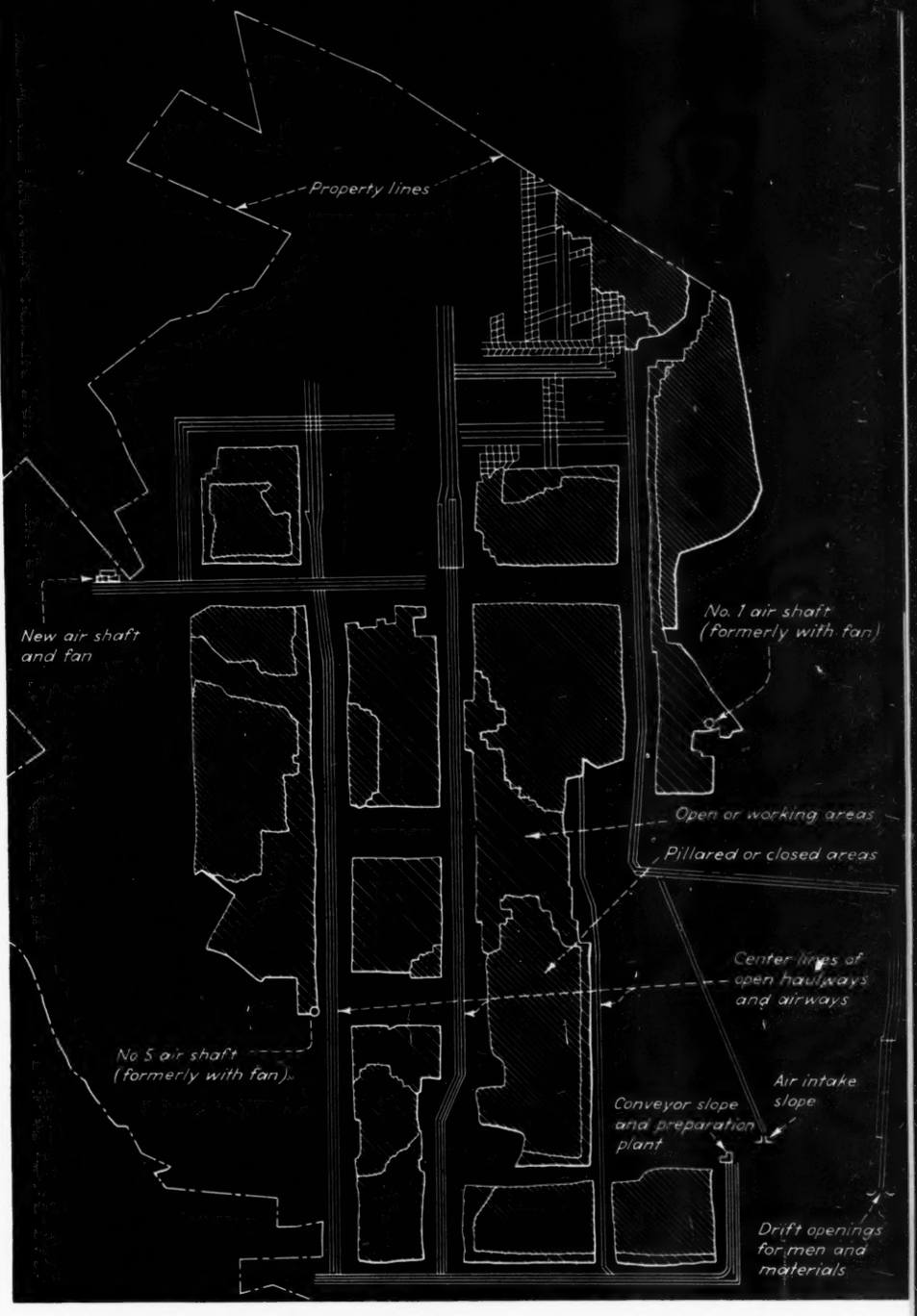
equipped with duplicate motors and duplicate starting panels. Provisions are made for full-automatic changeover, electrically and mechanically, from one motor to the other, leaving the spare motor idle so it is not being worn, is safe and convenient for inspection and is not wasting power.

A decision on this type of drive connection and control was the result of observations and thinking in the following steps: (1) most of the fan failures the company has experienced over the years were with the motors, hence an arrangement of two motors in place was desirable; (2) belt slippages (flat belts principally) had been another difficulty with the old installations and therefore V-belts were indicated. To make them 100-percent sure, automatic tightening was deemed necessary; (4) the expense of two motors called for getting their full advantage and this dictated the use of automatic couplings for changing over without delay; (4) to eliminate all delay, the electric starting and electrical changeover also should be arranged for automatic operation; (5) lack of sturdiness of starting apparatus had been another cause of a few failures on old fans so it was decided to buy heavy-duty over-capacity contactors and relays and assemble an extra-rugged automatic starter; (6) even so, a failure of any one item in the automatic control still would mean a failure in fan operation, so two complete duplicate starters were included in the final plan.

Spare Motor Cuts In

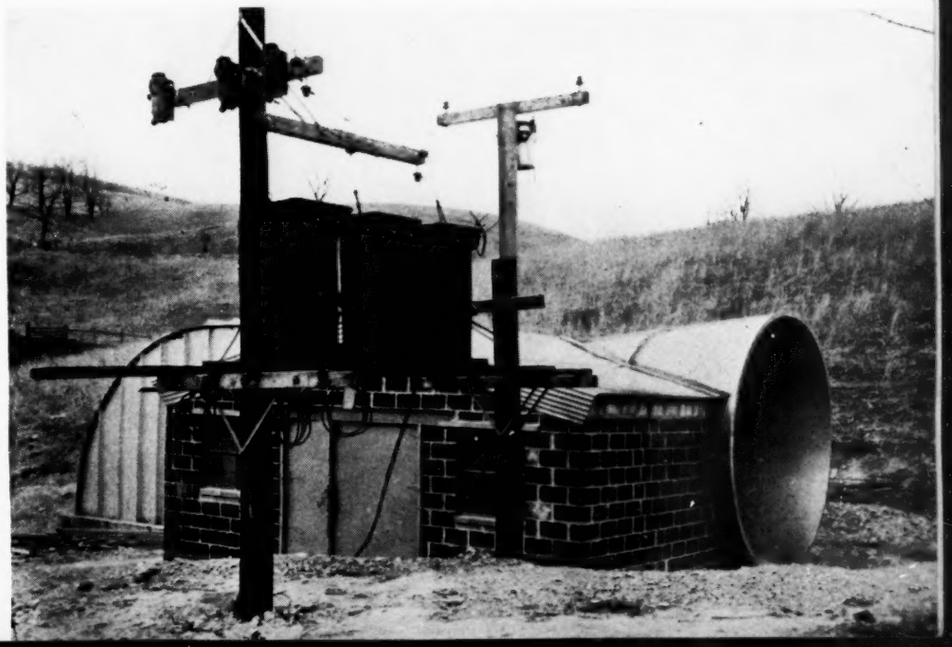
As the installation stands, if one motor trips out for any reason, the other controller is energized and starts the spare motor, which in turn, through its automatic mechanical coupling, takes over the fan load before there has been an interruption of ventilation.

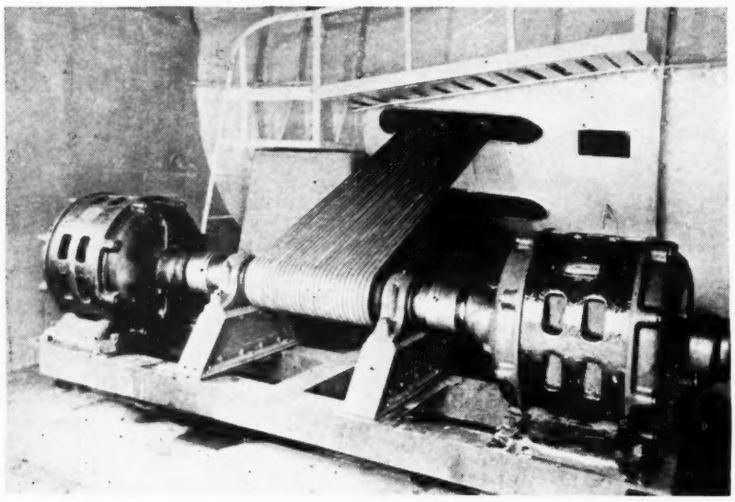
Motors, complete with a 9-in. pulley accommodating 26 7/8-in. Tex-rope V-belts, two Dodge-Timken bearing pedestals and housings, together with automatic couplings, are mounted on one No. 10 Rockwood pivoted base (10 ft. long) so that gravity maintains belt tightness. The automatic couplings, (Bartlett-Hayward Division, Koppers Co.) are stamped with the following markings: "Marland Won-


Property lines
New air shaft and fan
No. 1 air shaft (formerly with fan)
Open or working areas
Pillared or closed areas
Center lines of open haulways and airways
No 5 air shaft (formerly with fan)
Air intake slope
Conveyor slope and preparation plant
Drift openings for men and materials

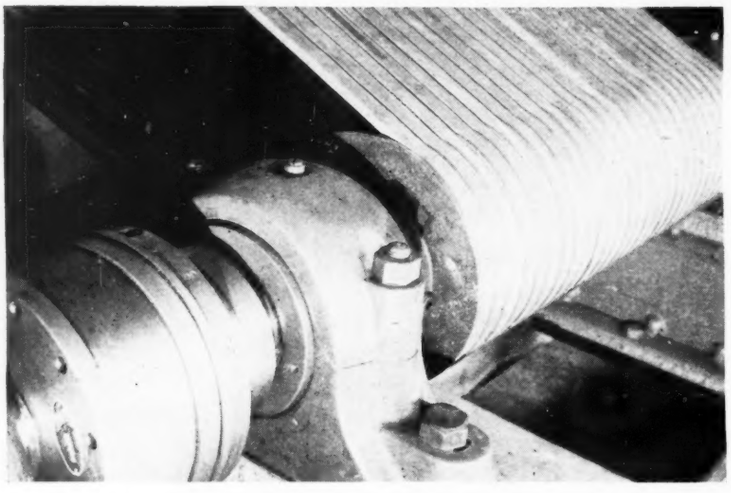
Under the improved ventilating set-up, Pursglove No. 15 mine now has one exhaust shaft and eight intake openings.

This fan circulates more air with less power. One side of the motor house is the fan evase.



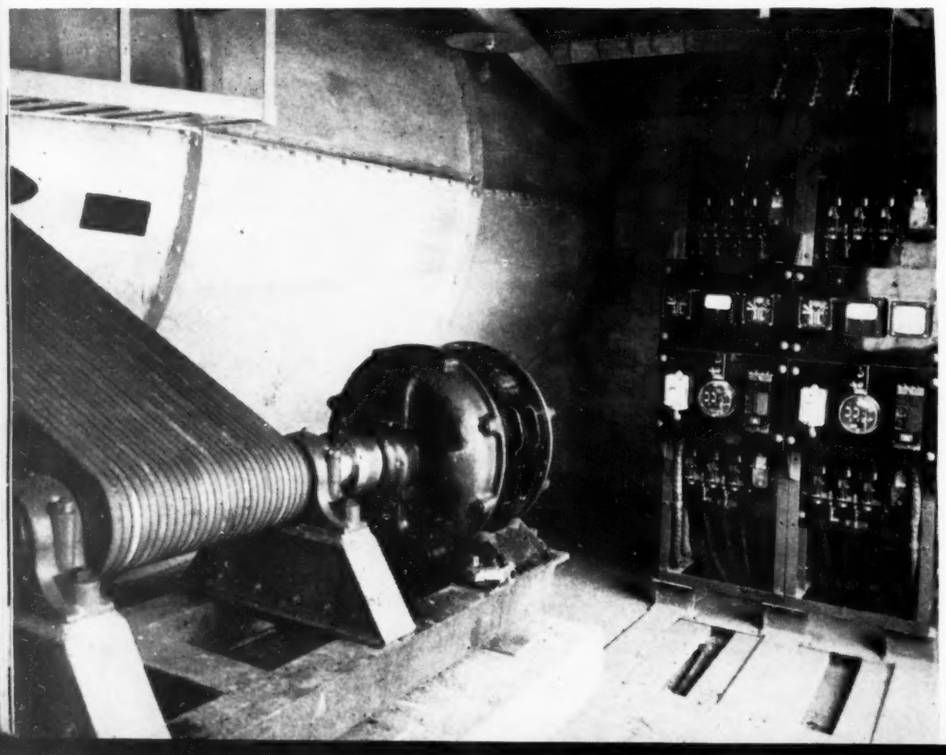


The pivoted base, accommodating two motors, insures constant belt tension.



Close-up of the free-wheeling clutch, ball bearing and 26 drive belts.

Duplicate starting panels complement duplicate motors.



way Clutch, Fast's Couplings." These couplings, explains Victor Zeni, chief electrician and master mechanic for the Pursglove company, operate on the principle that centrifugal force from rotation of the section on the motor shaft causes rollers to wedge between sprocket teeth and the casing of the driven section. Stopping of the motor section and continued rotation of the other causes the rollers to be forced back, thus allowing the coupling to free-wheel. Sprocket teeth are of a special non-symmetrical shape.

Contactors and relays of the starters were furnished by Westinghouse. The panels include I.T.E. circuit breakers controlling the 440-volt primary feeds to the separate 440/110-volt control-circuit transformers. The 100-hp. motors are Westinghouse 1,750-r.p.m. 440-volt Type CS units taking 126 amp. per terminal. They are started across the line with windings connected Y but are operated delta. Transformers at the fan consist of three 50-kva. General Electric units. Two could carry the load if one failed. Furthermore, three 25-kva. Pittsburgh transformers are located at the top of a borehole 400 ft. from the fan and in emergency could be connected to serve the ventilating load by installing temporary cables.

More Air With Less Power

The new fan operates exhausting as did the two fans that were taken out of service. Motor input to the new fan is 100 hp., the fan speed is 600 r.p.m., the volume is approximately 200,000 c.f.m. and the pressure is 3 in. w.g. The old No. 5 fan required 100 hp. to deliver 85,000 c.f.m. at 4 in. and No. 1 took 75 hp. for 65,000 c.f.m. at 3-in. pressure. Air in the mine has been increased about 50,000 c.f.m. and the electrical demand decreased by 75 hp. Now, the mine has eight intake airways made up of three shafts, three slopes and two drifts.

The motor house is built with the *évasé* of the fan serving as one wall. Other walls are cinderblock construction and the roof is corrugated galvanized sheet supported by structural steel. Although the fan is close to a paved highway and is "next door" to a farmhouse it is guarded in line with the times.

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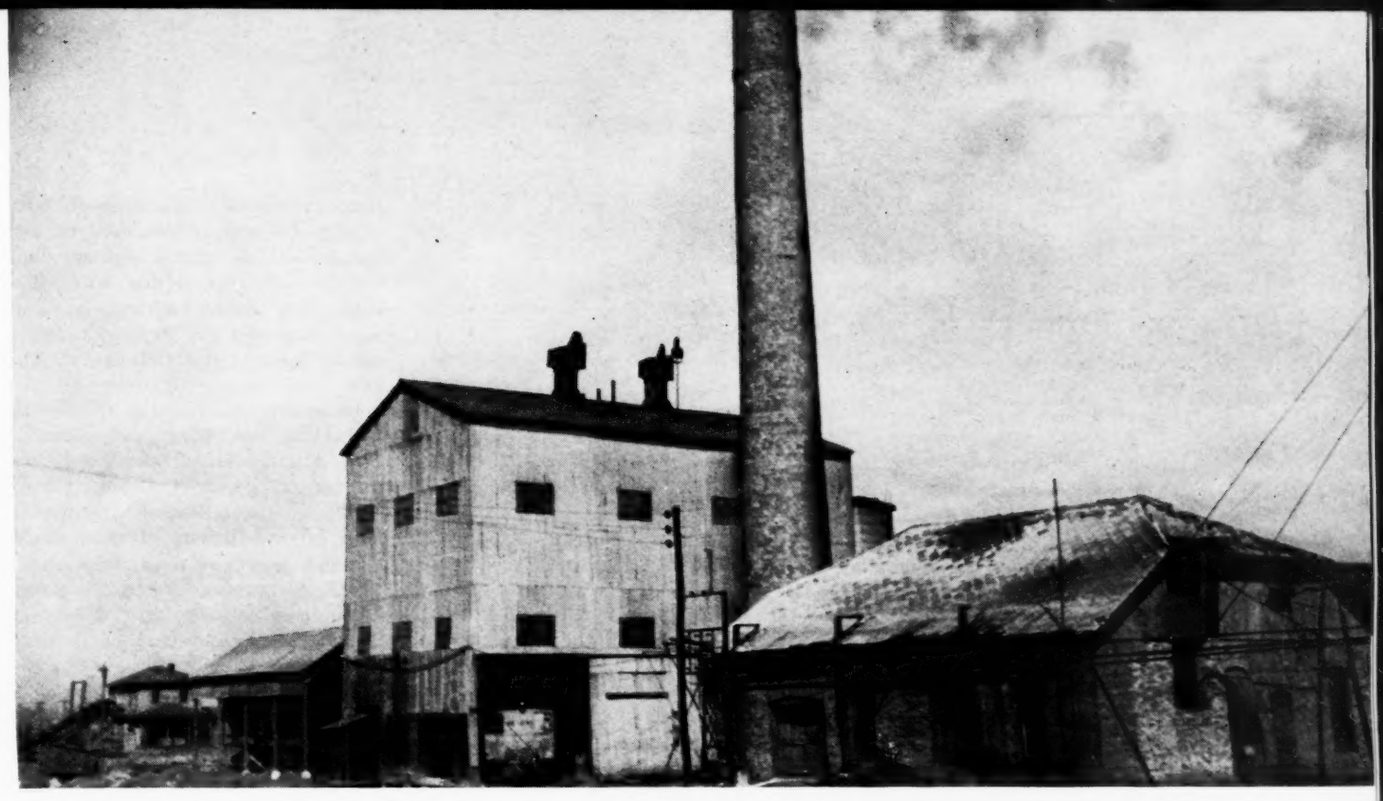


Steam-generator house, stack and engine room. The steam piping is short and well insulated.

MODERN STEAM GENERATOR

Takes Bigger Load From Tubular Boilers

Three Years' Use Demonstrates Feasibility of Automatic Steam Generation—One Unit Takes Over From String of Tubular Boilers—Automatic Controls Supplement Spreader-Stoker Firing—Fuel Is Carbon or Screenings.

By FRED W. RICHART
Editorial Staff, Coal Age

THE FEASIBILITY of almost complete automatic steam generation is demonstrated at the shaft mine of Centralia Coal Co., Centralia, Ill., as a result of three years of successful operation with a modernized plant. In that period of time, except for getting rid of "bugs" and breaking in attendants, not a day has been lost due to steam-generator trouble. The boiler is cleaned once a year in summer.

The basis of this steam generator is a used 600-hp. Edgemoor water-tube boiler having three 3-ft.-diameter steam drums and 312 4-in. x 18-ft. water tubes. This was set 20 ft. above the floor level on structural-steel supports. A water-lined furnace of modern refractories and ample combustion space was added. Stokers and the usual accessories to convert it into a modern steam generator completed the job.

The highly fluctuating power demands of a coal-mining load call for a type of steam plant that can meet heavy instantaneous overloads and quickly recover equilibrium. On the other hand, the combustion control must be such that long blasts from the safety valve must not follow a sudden drop of the load. These ideals are attained to a high degree by this steam generator in which alert automatic controls continually supplement the forgetful human element.

To arrange this boiler for the water-lined furnace, all but the outer two of the lower row of 4-in. tubes were removed. This provided connecting points into the circulating system. Ten curved tubes drop from the rear header into a 10-in. drum at the rear of the grates. From this drum, a set of ten 4-in. tubes, spaced on 7½-in. centers, follows up the rear furnace wall, then parallels the boiler tubes and connects into the front header. Four additional curved tubes drop from each side of the rear header to 8-in. square drums on either side of the furnace at the grate level. From these drums 3½-in. tubes on 8½-in. centers follow up inside the furnace side walls to connect

to 10-in. drums outside the setting. From these drums, 3½-in. curved tubes reach to the steam drums, completing the water circuit. This water lining adds nearly 10 percent to the boiler heating surface, but considerably more than that to the horsepower rating.

The front end of the boiler is set 20 ft. above the floor level, providing about 2,700 cu.ft. of combustion space. This permits complete combustion before the hot gases reach the cooling surface of the boiler tubes. Water-lined furnaces serve the double purpose of adding capacity and preserving the furnace walls. A further advantage is that surfaces exposed to the radiant heat of the flame are much more effective than surfaces merely exposed to hot gases.

The front furnace lining is made up of Detrick sectionally supported fire walls. Harbison-Walker refractories are used in side and rear furnace walls. All are laid in "Harwaco Bond" refractory cement. To provide for wall expansion there are joint spaces filled with Detrick plastic insulation. Refractories closing the top of the setting are carried on the side walls and the three steam drums.

The coal supply is conveyed a short distance horizontally from underneath a hopper coal car to an elevator which delivers it to a small bin above the stokers. Three pipes reach from the bin to three stoker hoppers which are kept filled by gravity. The coal burned is $\frac{5}{16}$x0-in., called carbon, or $\frac{3}{4}$x0-in. screenings, depending on market conditions. The latter is considered a desirable size.

Each of the three Continental spreader stokers feeds a section of the furnace. The drive shafts, connected in line by flexible couplings, are driven by a special Reeves belt to each of two 1½-hp. General Electric motors, one at either end. This is a duplicate drive, only one motor being required to do the work. Each motor is equipped with a Reeves variable-speed motor pulley. Shifting the motor on its base automatically changes the stoker speed.

The very fine coal is burned in suspension, while all the coarser coal falls on the grates to be burned there. Each grate section is fitted with a steam ram by which it is dumped. When fires are cleaned a section is dumped and righted. The coal feed for that section is then restarted. Furnace heat quickly rekindles the fire. The accumulation in the ashpit is blown out with a steam ash blower.

The air ducts under the grates are sectionalized so that the volume may be regulated to either of the three sections. Passing up through the coal and converting it into gaseous heat, the air, now a part of the furnace gases, passes among the boiler tubes giving up a large percentage of its heat, finally drops to the floor level in a large duct, passes through the induced draft fan and to the stack.

Clarage built the Size 4 induced-draft fan, which is driven by a 40-hp. General Electric d.c. motor. The required horsepower is somewhat less. A V-belt drive connects the two. The fan bearings are self-aligning SKF units. Bearings near the fan casing are air cooled by fan blades on the shaft.

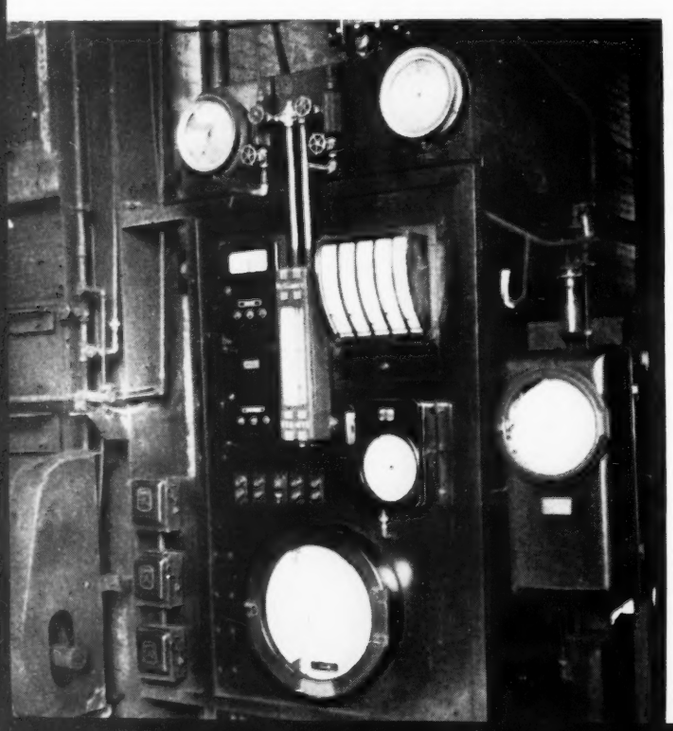
One of the novel features of this steam generator is the method of disposing of fly ash. Underneath the last upturn of hot gases are two bins for the collection of that dust. The sides slope to a discharge point at the bottom and are lined with a mixture of calcined clay and cement. The ash, containing much unburned carbon, is aspirated into the furnace by two steam jets, where the carbon is burned and the ash combined with the furnace slag.

The accessories handle, and to a large extent automatically control, the materials necessary to produce steam: that is, fuel, air and water. The water-handling accessories are a storage tank, heater, boiler-feed pumps and feed-water regulator.

Air from a small 3,600-r.p.m. Clarage motor-driven fan is discharged upward just inside the furnace doors to keep the front furnace wall cooled. Air for combustion is supplied under the grates by a Wing turbine-driven fan, controlled by a Hays Type EA-50 power unit—electric-motor driven.

Boiler feed water comes from the city mains and is delivered into a storage tank under float-valve control. From the tank water flows by gravity into a heater made from a 6x18-ft. discarded tubular boiler. Tubes and heads were removed and solid heads welded in. Inflow is regulated by a float valve housed in an arc-welded case made at the mine. Within the heater dripping water is exposed to exhaust steam and reaches an average temperature of 190 deg. F. From this heater water flows by gravity into either of two Smith-Vail duplex 12x8x12-in. plunger-type boiler-feed pumps furnished by the Platt Iron

This steam-generator control panel is almost as complicated as an electric-generator control. It even analyzes combustion gases.



The induced-draft fan is mounted on the floor where it may be looked after more easily. The draft is automatically controlled.

Works. Each pump is controlled by a Williams pressure governor to maintain 175-lb.-per-square-inch water pressure.

A Copes "Flowmatic" feed-water regulator actuated by the flow of steam from the boiler, and by a thermostat set at the water level, automatically controls the admission of feed water into the boiler. This combination keeps close control of the water level.

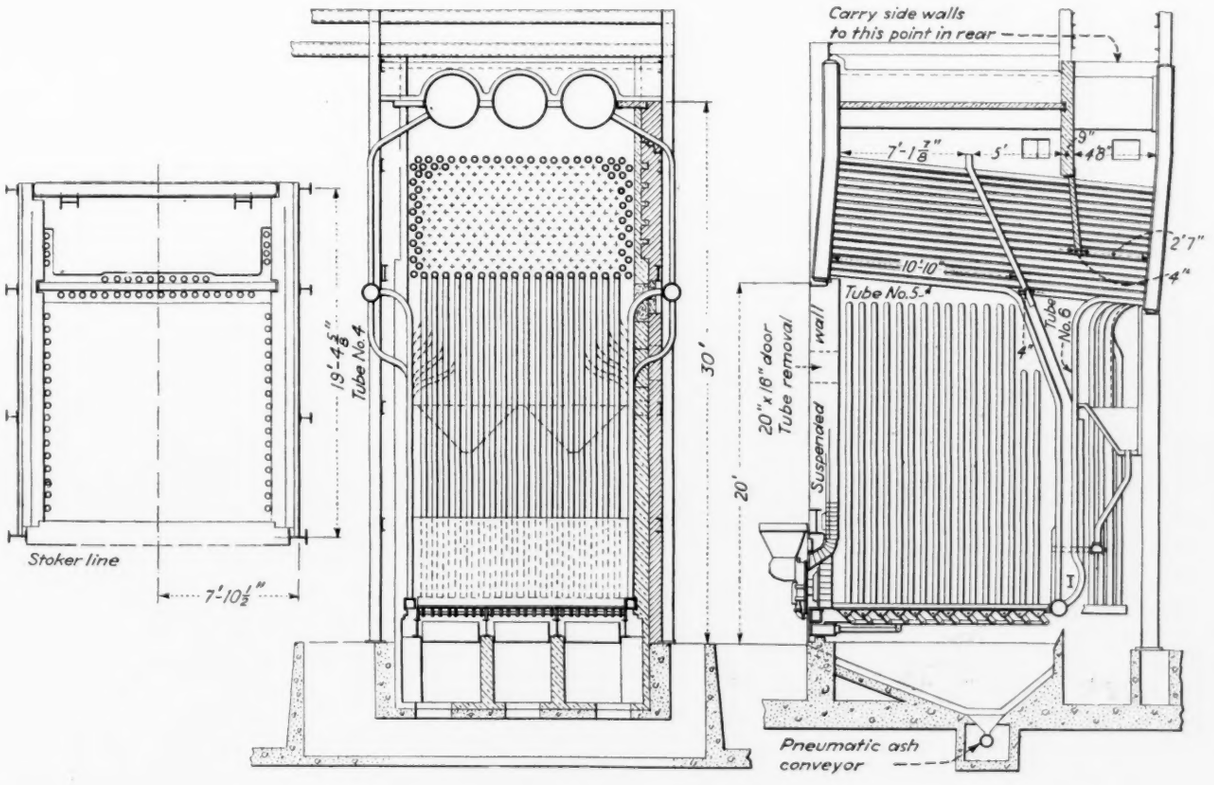
A Hays control panel mounts the instruments that control and record the operation of the steam generator. Among the processes which are automatically controlled by it are the intake air flow, the induced-draft volume and the quantity of coal fired. The registering instruments on the panel are a steam gage, feed-water pressure gage, Bristol recording steam gage, Reliance "Eye-Hye" water-level gage, Cochrane steam flow meter and Hays furnace-air-pressure gages. At the right of the panel is mounted a Hays combustion meter on independent supports. This instrument automatically analyzes and records the CO_2 content of the stack gases. This information enables the best combustion results to be obtained.

Other accessories are feed-water treatment to prevent scale and continuous blow-down to limit concentration of solids.

Stokers and control panel.

This steam generator is able to carry loads up to 1,800 hp. It supplies steam to a 24x42-in. double reversible steam hoist, the high-pressure side of a 625-kw. mixed-pressure turbo-generator, three high-speed direct-connected engine generators of 50-, 200- and 300-kw. capacity and numerous auxiliaries. The hoist and reciprocating engines exhaust into a regenerator which supplies the low-pressure side of the turbo-generator. All excess exhaust steam passes through an oil separator to the heater and thence to the atmosphere. A back pressure of approximately 3 lb. is maintained in the regenerator by suitable weighted relief valves.

This is a case of putting all of one's steam-generating eggs in one well-built basket and looking after the basket. After all, it is fair to ask, why duplicate steam generators where more than one is not justified when we are willing to put our trust in a single turbo-generator?



Design details, Centralia steam-generating unit.

RESULTS UP, COST DOWN

Following Isabella Preparation Refinements

New Crusher and Bin Equipment Facilitates Steam-Coal Reclamation—Variable-Speed Drives and Meter Improve Metallurgical Washing—Rubber Filter-Disk Coverings Help Dewatering—Results Close to 7.25 Ash Objective.

By J. H. EDWARDS
Associate Editor, Coal Age

HIGHER EFFICIENCY and lower cost are the objects in improvements in reclamation of coal, product uniformity, equipment maintenance and operating flexibility made at the preparation plant of the Weirton Coal Co., Isabella, Pa., since its last appearance in *Coal Age* in April, 1940 (p. 71), when the addition of a reclamation washer for "mine slate" was described. The changes include two new crushers, variable drives on wash-box elevators, meters to indicate tons per hour and percentage of refuse in the wash-box feed, an improved covering material for vacuum-filter sections, equipment to move the No. 3 gate refuse to the reclaiming washer, a slate bin for storage of the feed and three new belt conveyors for separate transportation of the reclaimed steam coal to the river terminal.

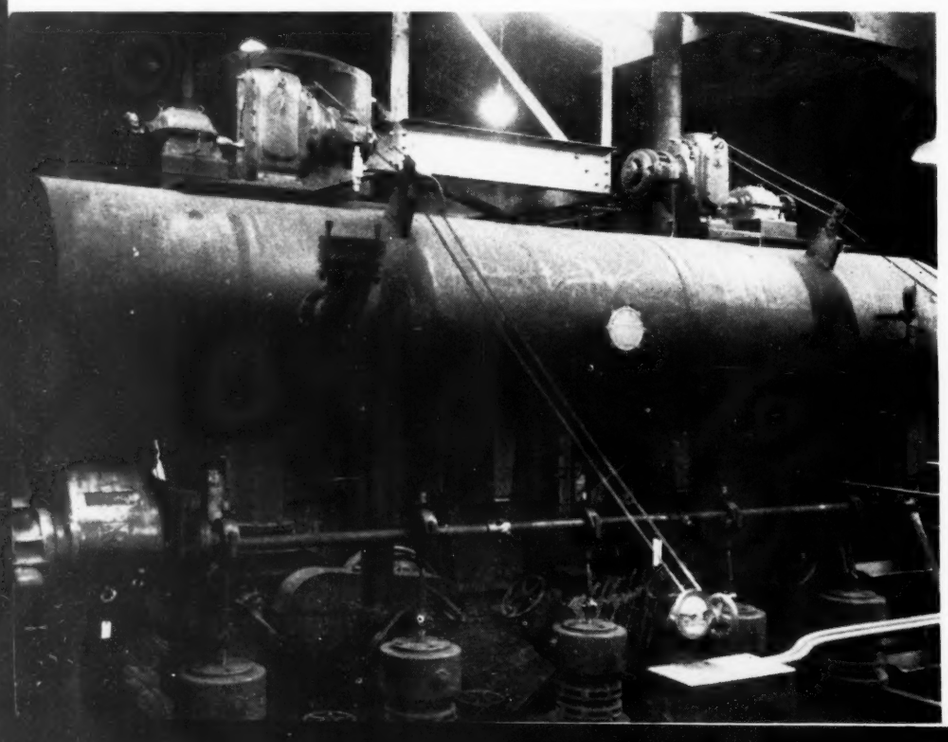
The Isabella washing plant, new in 1938 and described that year in *Coal Age* (July, p. 63), prepares coal for metallurgical purposes (Weirton Steel Co.) in two Link-Belt air-pulsated jigs and reclaims steam coal from refuse and middlings in another jig of the same make. The coal, from the Pittsburgh seam and mechanically loaded, is brought up from the mine bottom on a slope belt. A feature of the plant is a 1,000-ton blending and storage bin from which the crushed mine-run is fed to the metallurgical washers at a gross rate of 370 tons per hour. Both the metallurgical and steam coals are shipped by barges on the Monongahela River.

Until the most recent improvements were completed March 1 of this year, coal larger than 4 in., separated on a scalping screen, was reduced to 4x0 in. by a coal-type crusher. Mine slate, including about 30 percent combustible of steam quality, from the head-coal and rooster-coal strata was bypassed by a fly at the discharge of the slope conveyor to another crusher, where it also was reduced from mine-run size to minus 4 in. for washing in the reclamation jig. For maintenance reasons, the coal crusher was replaced by a McLanahan & Stone quarry-type unit. Now, this crusher and the existing slate crusher both receive only a minus 8-in. feed as a result of the installation of another McLanahan & Stone quarry-type crusher at the bottom of the slope, between the rotary dump and slope belt, to crush all material loaded in the mine.

Advantages of this preliminary crushing are fourfold. Heretofore, mechanical loading at the face was hampered to some extent by the necessity of breaking up pieces of slate, coal or rock over 18x18x12 in. in size. Now, everything the mechanical loader can handle goes into the mine cars. Carrying only material that has been crushed to 8 in. will add to the belt life and there also is a maintenance advantage in the reduction in the top size that the other crushers must handle. Finally, less picking is done, with a resultant saving in labor.

The new crusher at the slope bot-

Air receiver and top mechanism on one of the two metallurgical jigs. On top of the receiver are the motors and variable drives now operating the elevators. Bottom left is the motorized reducer whose only duty now is rotating the air-piston eccentric shaft. The load is constant and therefore the speed variation is practically nil.



tom is a 30x54-in. sledge-wedge single-roll unit rated at 700 tons per hour. It is driven by a 100-hp. 2,300-volt wound-rotor General Electric motor with reversible drum control. The drive connection is ten 1¼-in. Manhattan V-belts. The new quarry-type crusher which reduces the 8x4-in. coal to minus 4-in. is a double-roll 30x36-in. machine driven by a 30-hp. General Electric 440-volt squirrel-cage motor with contactor control of the same make. This crusher, which operates at a very slow speed, makes a minimum of fine-coal degradation, as did its predecessor. Its drive consists of eight 1-in. Gates V-belts. Remarkably little dust gets into the air around the crushers due to the way the coal and slate have been watered both at the working face and in transit and also due to the crusher inclosures. From the double-roll coal crusher, a suction air pipe exhausts dust to a cyclone collector.

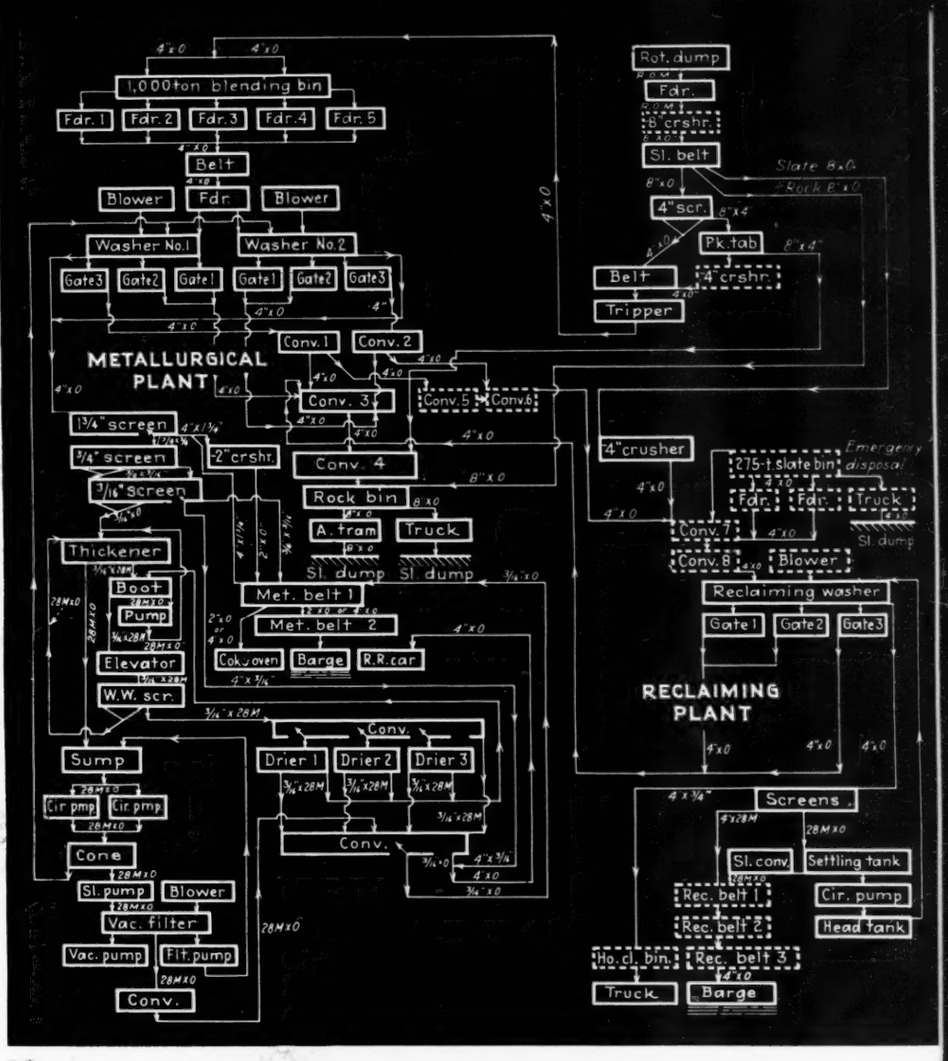
Middlings Now Re-treated

Middlings from the No. 3 gates of the two metallurgical-coal washers, aggregating 300 tons per day (the plant operates three shifts), originally went to the aerial tramway for disposal. Now, they are put through the reclaiming washer, to accomplish which four conveyors were installed. Mixed with the crushed mine slate, the two together constituting about 1,000 tons per day, the middlings are sent to the washer through a new 275-ton steel storage bin.

Total feed to this two-compartment four-cell steam-coal jig is 125 tons per hour, containing only 1.5 percent of material between 1.50 and 1.70 gravity. The middlings average 75 percent coal of steam quality and, as before mentioned, the coal content of the crushed slate is 30 percent. Operating at 1.60 specific gravity, the washed coal contains no sink, and the refuse only 0.5 percent float, which is almost entirely a hutch product.

The addition of variable-speed drives and a meter to indicate quantity and quality of feed has improved operation of the two-compartment five-cell metallurgical jigs, each of which handles 185 tons per hour. Analysis of the raw coal shows an average of 14.5 percent ash and 1.74 sulphur. In the washed coal, the ash is reduced to 7.25 and the sulphur to 1.23 percent.

One 5-hp. motor originally drove the elevators, piston eccentrics and screw conveyors on each wash box through a lineshaft. This was



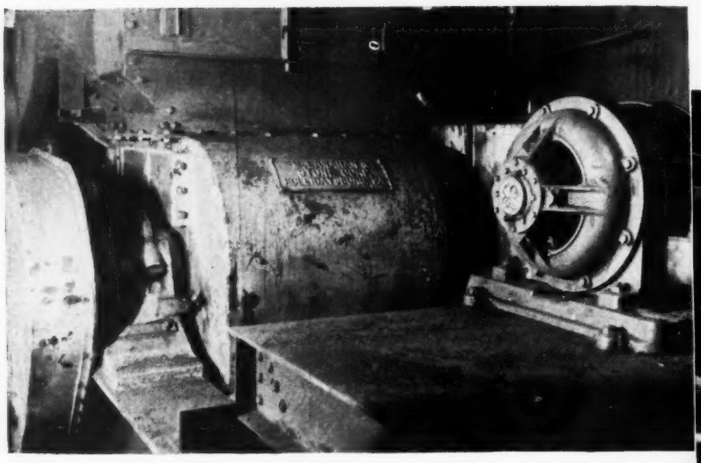
Revised flowsheet, Isbella preparation plant, showing new units in broken lines.

changed to individual motors with Link-Belt P.I.V. variable drives on primary and secondary elevators and a third separate motor with constant-ratio gear reducer for driving the piston eccentric shaft. Five of the motorized P.I.V. units were installed: that is, two on each metallurgical box and one on the reclaiming box. The change freed the piston eccentric shaft motors of other loads.

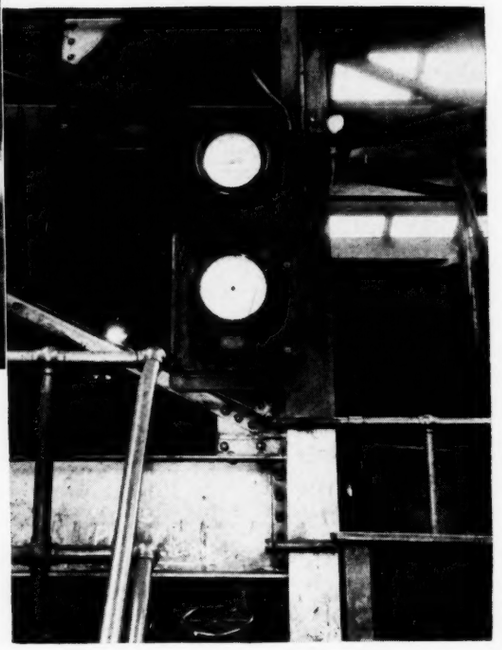
With this arrangement there is no tendency toward slowing of the air-pulsation rate when peak refuse loads hit the elevators, which is the very time when uniform pulsation is most necessary. Although a squirrel-cage motor, as was used on the lineshaft, is nominally a constant-speed unit its drop in speed with additional elevator loads was too great for the close regulation of air pulsation required. Putting the individual drives and P.I.V. variable units on the elevators made it possible to run them slower than the peak requirement 80 percent of the time, thus reducing wear on the elevators.

The 36-in. belt conveyor feeding the metallurgical washers includes a Merrick Model E Weightometer, which is part of the original 1938 installation. Its job was to record the feed over a given time. The instantaneous readings provided by this scale are a function of the percentage of refuse in the feed because the bin blending feeders supply a constant volume to the belts. A Merrick Ratograph indicator of the dial-type was added to the unit and placed near the operator's station along with a graphic recorder with circular chart. This indicator and recorder were installed primarily to assist in maintaining a uniform feed to the wash boxes; however, they have proved of great value in showing the operator the fluctuations in percentage of refuse in the raw-coal feed, thereby enabling him to do a better washing job with greater ease.

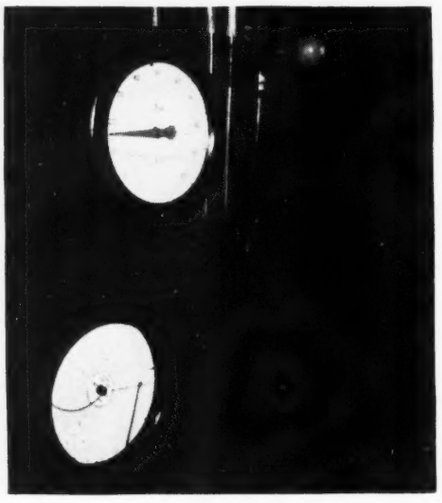
Minus 28-mesh material from the settling cone in the closed-circuit washing system is dewatered in a 25-tons-per-hour disk-type filter (eight disks 8½ ft. in diameter). Renewal of the fabric coverings of the individual sections of the disks was an expensive and troublesome maintenance item. Somewhat over a year ago, the management adopted "Multipore" rubber sheet, a recent U. S.



New crusher of the quarry type reducing 8x4-in. coal to minus 4-in. ahead of the metallurgical washers.

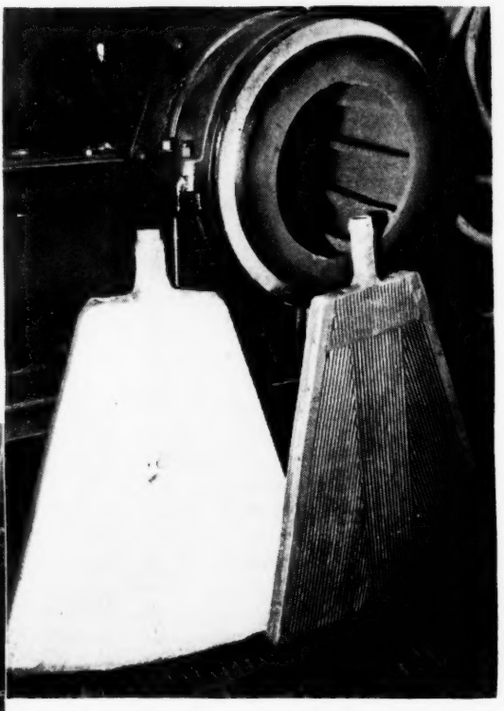


Coal-feed meters are near the jigs and plainly visible to the operator.



Close-up of the coal-feed meters. The upper indicates flow in percentage of full load and the lower makes a record.

Porous rubber for fabric reduces maintenance on this vacuum filter with eight 8½-ft. disks.



Two filter sections. Right is a frame without covering; left is a section covered with porous rubber ready for use.

Rubber product, with the result that the life of the coverings has been greatly increased. Coal discharged from the filter now runs uniformly 19 percent moisture, a reduction of 2 percent compared to cloth-filter bags.

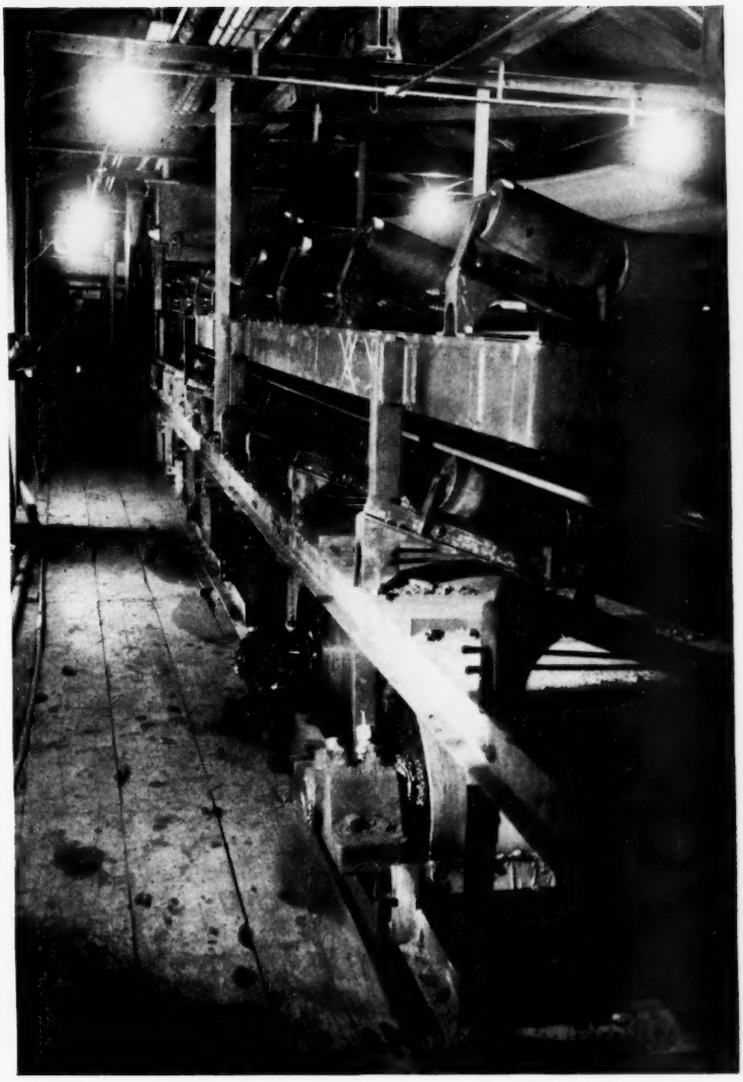
Approximate thickness of this new covering material is 3/64 in.The round holes, or pores, are 0.004 to 0.005 in. in diameter (6,400 holes per square inch) with a reinforcing of rubberized cords running both ways on ½- and ⅝-in. and centers. Considerable experimenting was done and the wood ridges of the filter-disk sections had to be modified before best results were obtained.

Steam Belt Added

For some months after the slate-washing steam-coal reclamation plant was added in December, 1939, the steam coal could be loaded separately on the river barges only when metallurgical coal was not being loaded—the reason being that there was only one belt conveyor to the river. In the construction of the gallery, left over from the plant serving the operation prior to the improvement program completed in 1938, no provision had been made for a second belt. By a close squeeze, however, it was found possible to install a steam-coal belt above the other. For the new conveyor (36 in. wide and 329 ft. long center-to-center), idlers interchangeable with the Link-Belt idlers and Timken bearings on the metallurgical belt were selected.

Instead of buying new belting for the steam-coal conveyor the 6-ply 28-oz. duck ⅛-in. cover belting, which already had handled 6,000,000 tons of metallurgical coal, was shifted to the new steam-coal conveyor, and a new belt was installed on the heavier-duty metallurgical conveyor. This new belt, furnished by Manhattan, is of the latest 5-ply flexible-cord construction. Speed of the new steam-coal conveyor, equipped with the old belting, is 80 f.p.m. The drive is a 5-hp. motorized reducer (Link-Belt and G.E.). A downgrade in favor of the load causes the conveyor to operate with very little power after starting. Now, with this additional belt, separate barges can be loaded simultaneously with metallurgical and steam coal.

It was necessary to add two other new belt conveyors for handling the reclaimed steam coal between the dewatering screens and the river belt. The first, termed Reclamation Belt No. 1, is 36 in. x 80 ft. center-to-center, and the other, Reclamation Belt No. 2, is the same width but 83 ft. long. Idlers are Link-Belt with Timken bearings, and the belts are Manhattan 5-ply with drives consisting of 10-hp. 440-volt General Electric motors connected by V-belt and open gears. In both cases, the conveyor speed is 125 f.p.m.



By a close margin, room was found in the river-conveyor gallery for installation of a duplicate 36-in. belt above the existing metallurgical belt, thus effecting separate handling of the steam coal from reclamation plant to barge.

Mention has been made of new equipment to move the No. 3-gate refuse to the reclaiming washer. This equipment consists of four flight conveyors numbered 5, 6, 7 and 8, the first two of which are duplicates (14 in. x 20 ft.) serving as feeders from the No. 3 gates of the metallurgical boxes to a dual-purpose flight conveyor (No. 7) 20 in. wide on 90-ft. horizontal and 30-ft. vertical centers. The dual-purpose unit serves to deposit the material in the 275-ton bin previously noted and also move it from the bin feeders to a fourth new flight conveyor (No. 8, 30 in. x 60 ft.) which elevates and feeds to the reclamation box. On these conveyors, the motors also are 440-volt General Electric units—3-hp. on each of the first two, 15-hp. on the second and a 10-hp. on the last.

The Isabella plant now operates very close to its objective of an ash content of 7.25 percent in the washed coal with tolerances of 0.15 percent above and below, or a total variation of 0.30 percent. Of the control analyses, over 90 percent come within that range. Normal operating labor consists of nine men per shift, six in the metallurgical plant and three in the reclamation plant.

SPOIL RECLAMATION

Includes Setting 7,000,000 Trees in Illinois

Over 7,000,000 Trees Planted Since 1930 on 7,250 Acres—Old Spoils Also Made Suitable for Grazing, Fishing, Wild-Life Propagation and Recreation—Some 2,000,000 Trees Set Out in 1942 Alone in Illinois

A TOTAL of 7,250 acres planted with over 7,000,000 trees in less than ten years is the record for strip-land reclamation by Illinois producers, in addition to work directed toward making old spoils suitable for grazing, fishing, wild-life propagation and recreation. Over 2,000,000 of the trees planted were set out in 1942 alone, and plans call for continuing and expanding the program.

Tree-planting on strip spoils in Illinois goes back at least to 1930-33, when a Fulton County company forested 180 acres of worked-over land. When examined by the Illinois Forestry Division in 1938, it was found that over 75 percent of this planting had survived. Individual trees ranged up to 4 to 6 in. in diameter and up to 20 ft. in height. The species included red pine, Scotch pine and black locust, with the locust showing the greatest growth.

In the spring of 1938 several operating companies in six Illinois counties planted 300,000 trees on 275 acres of stripped land. The results were so satisfactory that forestation of worked-over lands was shortly after adopted as a policy by the Illinois stripping industry, and in 1939 eleven large producers planted more than a million trees on 1,100 acres of spoil banks at a reputed cost of $10.84 per acre. This was followed, in the spring of 1941, by the planting of 1,600,000 trees on 1,596 acres in line with a program calling for planting each year an acreage equal to that mined in the previous twelve months. Plantings in the current year have totalled 2,000,000 trees, bringing the total worked-over land to be forested in Illinois to 7,250 acres.

Plantings in the years 1930-41, inclusive, were 5,083,000 trees. The acreage involved was 5,200 in twelve counties, as shown in the accompanying map. Black locust and conifers (see Table I) led the list of species.

Some areas that were stripped many years ago now have heavy growths of volunteer timber. Much of this is large enough for fence posts, mine props and even lumber. All of this land grows luxurious sweet clover, one reason being its "sweetening" with limestone brought to the surface in stripping. Some areas in upstate Illinois have been made into parks, recreation centers, and fishing and hunting grounds.

Operating men, on the basis of experience to date, are convinced of the value of forestation as a State economic asset and as a means of producing income from what might otherwise be a lost investment. Progress in the work and its economic value were the subject of "The Open Cut Mining Industry of Illinois," issued for the use of mining men, taxing authorities and laymen by the Illinois Coal Strippers' Association. This report deals mainly with the forestation phase of reclamation and conservation, but it also touches on other activities, including the ranging of sheep and cattle in Fulton County, where experiments are proving profitable.

The operators' association is of the opinion that the long-range benefits will amply justify the outlay, including the prospect that the return from timber will be better than the year-by-year crop returns from similar lands. With the best Illinois land rated at 1 for cropping purposes and the poorest at 10, the Department of Agriculture of the University of Illinois rates the lands now held for stripping at 7.49. The average rating for all counties where stripping is done is 5.63.

Local taxing authorities, however, make no concession for this rehabilitation work and the State offers no bonus as a conservation measure. In practically no instance is there a reduction in the real-estate assessment on mined-out areas, making it imperative that something be done to offset continuing taxes.

Forestation is carried on in cooperation with State and other authorities. The State Forestry Division, for example, assists by furnishing seedlings from nurseries at Jonesboro and Havana, advising as to varieties for planting and furnishing supervision. Cost and handling of trees, as reported by one company, is slightly less than $3 per thousand. Setting is paid for by the coal companies. Recent reports indicate a 90-percent survival, or substantially better than with earlier plantings.

Table I—Species of Trees Planted on Worked-Over Open-Cut Mining Lands in Illinois, 1930-41, Inclusive

Black locust	1,761,900
Conifers	1,462,000
Oaks	275,500
Walnut	257,000
Silver maple	364,000
Cottonwood	303,500
Sycamore	67,000
Poplars	78,000
Red Cedar	2,000
Cypress	9,000
Ash species	213,500
Tulip poplar (yellow ash)	31,500
Red gum	10,000
Honey locust	2,000
Osage orange	33,500
Hackberry	37,000
Catalpa	36,000
Hickory	1,000
Box elder	2,000
Wildlife species: wild plum, wild cherry, grape, dogwood, Japanese honeysuckle, mulberry, service berry, hazelnut, elderberry	36,000
Miscellaneous species, no record	102,100
Total	5,083,500

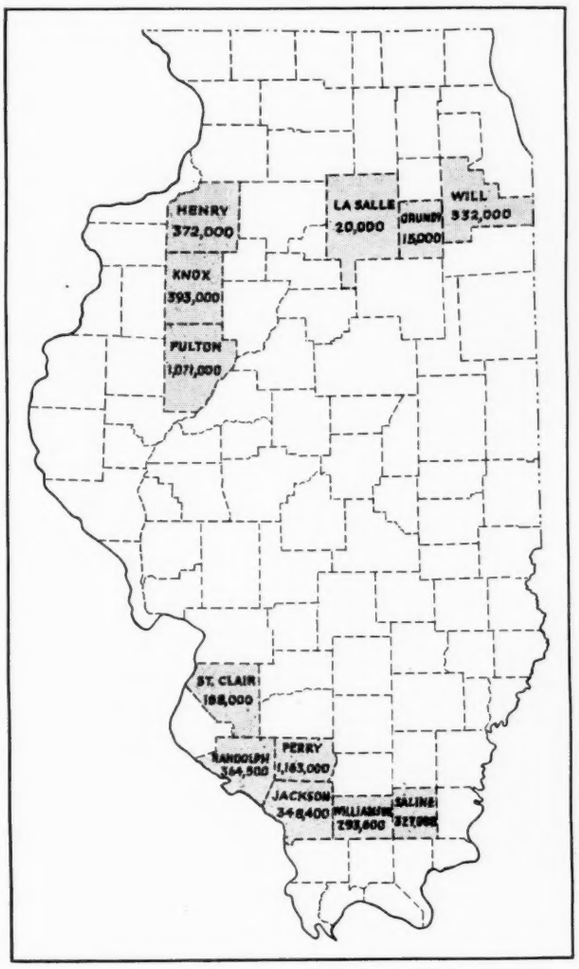
Planting being a seasonal operation, trees must be held at the nurseries ready for immediate delivery. Preparation for storage and shipment is a vital factor. At the Jonesboro nursery, for example, trees are dug and piled in the packing house. The roots are washed free of earth and the trees are counted and tied in bundles of 50. Forty bundles, with the roots in the center, are packed in a bale for convenience in handling and storage. Wet moss between the root layers in the bales preserves the vitality of the trees for six or more months. A finished bale measures about 14x20x36 in. Cold storage, at 42 deg. F., is provided in a concrete vault dug into the south bank of a hill. With a capacity of about two carloads, the vault is refrigerated by a 1½-hp. electrically driven thermostatically controlled ice machine, supplemented by facilities for humidity control.

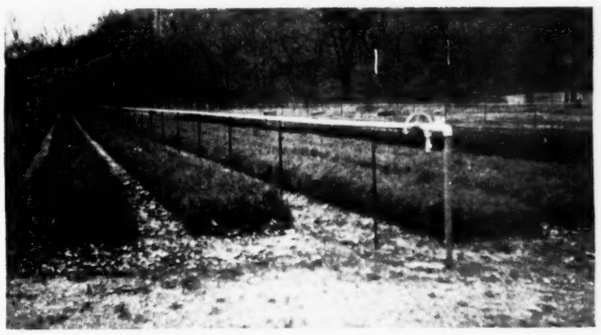
A 10-in. 10-year cottonwood volunteer, Pyramid Coal Corp., Pinckneyville, Ill.

Planted black locusts, United Electric Coal Cos., DuQuoin, Ill.

15-year-old volunteer growth, Truax-Traer Coal Co., Elkville, Ill.

Tree plantings on stripped land in Illinois, 1930-41, inclusive, by counties. Area planted, approximately 5,200 acres.





Jonesboro State tree nursery. Irrigation is supplied by a reservoir on a nearby hill.

Automatically conditioned cold-storage vault for packed trees at Jonesboro nursery

FOREMEN'S QUESTION FORUM

By Close Sealing, Electric Fire Is Held Within Confines of a Single Roadway*

By R. H. NICHOLAS
Chief Mine Inspector, Pittsburgh Coal Co., Pittsburgh, Pa.

IN THESE war days, the operation of a large mine, despite a troublesome underground fire, may furnish suggestions to those with a like problem. For a few minutes, at 5:30 a.m., Oct. 8 of last year, the circuit breakers in the substation at Montour No. 10 would not close, thus indicating a heavy discharge of current to ground. Thereafter, however, the current reestablished itself.

On investigation of this electrical failure, a pumper reported that the trolley wire was burning and lay on the floor in No. 21 face heading, an unoperated portion of the mine. The general assistant foreman found that the trolley wire had come in contact with the outby mine car of a trip of loaded wood mine cars stored in the heading. The power switch, which should have been disconnected from this section as soon as the loaded trip was placed, was found to be set in the "on" position. But no roof had fallen nor had any other disturbances occurred at that point to explain why the trolley wire had sagged enough to touch the mine car and burn off, so the assistant foreman looked for an earlier cause for the electrical ground, and this he found in the derailment of the cars further inby. This derailment caused a contact with the trolley wire which resulted in a heavy ground but one nevertheless not sufficient to open the breakers in the substation, which later, tripped by the contact of the hot wire with the mine car, opened, then reclosed, burning the wire and clearing the line.

Tried Direct Fighting, but Were Driven Out—When the fire was discovered, the cars were burning, making it difficult to fight it, and when the trip was cut as near the fire as possible and the cars were removed it was almost impossible to get close enough to the fire for effective work. On notification of State and federal officials, four mine-rescue crews arrived from the central rescue station, which joined with the company officials in an attempt to fight the fire by direct means, but after a few hours they were forced back by heat and smoke and then decided that the section must be sealed.

Fortunately, the fire occurred in a section that was not working because it was ahead of its development schedule; only one man, on a single shift, a pumper, being employed in the section, though the heading was used on the third shift each day for car storage.

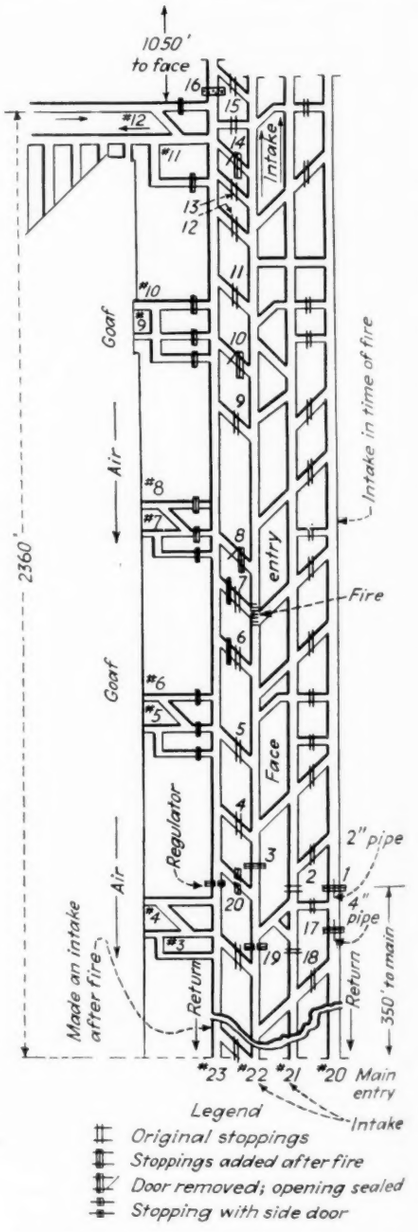
The section consists in the main of four parallel face headings which had been stopped at a point 3,400 ft. from the main entry. These headings are numbered from right to left passing inby—Nos. 20, 21, 22 and 23, with the haulroad on No. 22, with Nos. 21 and 22 as intake airways, and the outside headings as returns. These returns were separated from the intake headings by concrete-block stoppings. For 2,000 ft., on the side adjacent to No. 23 heading, with which it was connected in numerous places by open bleeders, is a long goaf area measuring 2,000x2,100 ft. which is known to give off methane. Not until No. 12 butt heading is reached is solid coal found and then only on the left side; this is 2,360 ft. from the main entry. There are no openings on the right of the section, which at the time of the fire was ventilated by a single air split, so for some time the three right headings, including the one designated as a return, were being used as intakes, the air going near the faces and returning by No. 23 heading on the left.

Ventilation Revised

Feared Fire Might Spread in Goaf—Only the chain pillar and the concrete-block stoppings in the crosscuts separated the fire from the return in No. 23 heading. A spread of fire into the return aircourse was of immediate concern as the combustion might easily have spread into the goaf, in which case it might have been necessary, despite the need for coal, to shut down a large part of the mine, if not all of it. To prevent this possibility and to confine the fire to the smallest possible area, the return was changed to the right side—that is, No. 20 heading—where enough of the stopping was removed near the main return to convert the stopping into a regulator. Air to ventilate No. 23 heading was taken from the intake and coursed to No. 11 butt heading, where it joined a split from another section.

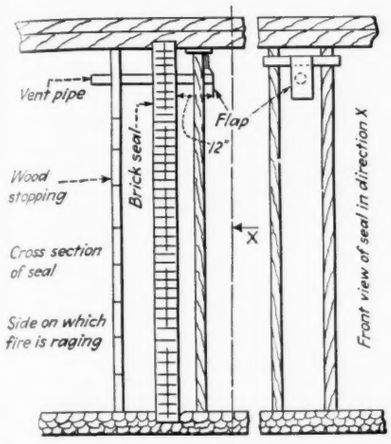
At about the same time seals were started at Nos. 21 and 22 face headings while stoppings between those headings were being reinforced by the erection of others. Seal No. 16 was started across No. 23 face heading at a point beyond No. 12 butt heading. However, until just before the last seal in No. 20 heading was closed, this seal was built up only until its upper surface rose within a foot of the roof.

In No. 1 stopping, a 2-in. ventpipe was placed and fitted as shown in Fig. 2. Such pipes have been used quite generally in fighting fires on the property of this company. Two posts are erected, one on each side of the pipe, with a crosspiece set back about an inch from the pipe and with a square of 3-ply brattice cloth nailed thereto. This cloth, hanging loosely over the pipe, permits air to leave the fire area but not to enter, so seals never are subjected to any undue pressure. Both large and small fires have thus been sealed successfully. Another seal, No. 17, was set outby 50 ft. from Seal



Plan of entry in Montour No. 10 where fire occurred.

*Brief of article entitled "Procedure Used in Fighting Recent Mine Fires—in Pennsylvania," read at Mine Inspectors' Institute of America, May 25, 1942, Lexington, Ky.



Cross section of stopping equipped with one-way valve; also front view of valve.

No. 1 so as to prevent leakage. This also had a 4-in. pipe. Solid stoppings Nos. 18 and 19 also were added.

As the split on No. 11 butt left ventilated active workings on that roadway, the air had to be reversed in No. 23 face heading and a regulator erected. The bleeders also had to be closed. The final seal was placed Oct. 8, and air samples and temperature readings were taken every day for two weeks and thereafter twice a week from 12 hours after the stoppings were erected until the area was opened.

Fire, If Any, Covered by Fall

Fire Area Opened Without Preliminary Exploration—Because it was expected that the falls of roof coal had so covered the coal seam that an exploration would not reveal anything, it was decided that such an exploration before unsealing would serve no purpose, so when the seals were broken, Friday, Feb. 13 (chosen because the mine would not work for three days), the air was allowed to course freely through the fire area. Just before the seals were broken, oxygen content was 0.6; carbon dioxide, 1.8; carbon monoxide, 0.0; methane, 77.8, and nitrogen, 19.8 percent. No carbon monoxide had been found since Dec. 12, 1941. The seals had confined a space of 1,000,000 cu.ft. At one time, the content of methane behind the seals had reached 78.4 percent; thus about 800,000 cu.ft. of methane had to be removed from the area. From the seals to the return of the other splits was 600 ft. and the bottom of the shaft was another 1,000 ft. A constantly increasing volume of air, therefore, entered the returns to dilute the gases. The area adjacent to the sealed space had been heavily coated with rock dust and a 3-in. water line and fire hose had been prepared for use if a fire had been found which would have had to be fought by direct means.

About 1,100 tons of materials had to be removed to the outside. Six mine cars were found under the fall. At the extreme ends of the fire, the coal was burned to a depth of 6 in., and, where the fire started, to a depth of 12 in. The fire had passed through the crosscuts to the parallel heading and caused some falls and coking.

Montour No. 10 produces 6,000 tons of coal daily, some of which is loaded by hand into cars, some by hand onto conveyors and some into cars by Joy loading machines. The mine normally employs 200 men. It is a drift mine with the ventilating fan near the top of a shaft located about two mines from the drift mouth. The fan circulates 260,000 cu.ft. of air per minute at a 4-in. water gage. About 750,000 cu.ft. of methane is emitted by the mine every 24 hours.

What Can Be Done to Make Explosions Cause Fewer and Less Severe Accidents

Use of explosives in order of their receipt, so that they will not deteriorate prior to use and so cause misfires; care to keep them in dry, cool, well-ventilated magazine where the cartridges will not stand on end and thus permit any liquid content to concentrate or to escape. Loose nitroglycerine used in the explosive for sensitizing may be exploded accidentally if on magazine floor. Over-age explosive destroyed, as attempts to use them will result in misfires or slow burning of explosive.

Protection of magazines from heat. Excessive heat, especially when alternated with cold, will make ammonium nitrate explosives hard and insensitive; hence a steel magazine requires protection from the sun, such as a false wood roof with space for passage of air.

Exclusive use of permissible explosives or coal breakers operated by expansion of carbon dioxide, air or liquids under pressure or a wedge to bring down the coal.

Employment of competent shotfirer to charge, stem and fire all explosives.

Storage of detonators and explosives in separate magazines, transportation of them in separate containers and keeping of them apart at the working place until used in charging.

Handling explosives carefully and opening boxes of such material only outside the magazine and with aid of a wood wedge and a wood, fiber or rubber mallet.

Never Force Cartridges

Where cartridges are of large diameter, insistence that all drills be kept close to standard diameter, so that cartridges will not have to be forced into hole. Provision that drills will be so short that no hole can be drilled, charged and shot that will exceed the depth of undercutting or shearing. This can be assured by instructions to blacksmith where holes are hand drilled.

Insistence that charges be tamped to the mouth of drillhole with incombustible stemming and that the first stemming be lightly tamped and the pressure increased until the mouth of the hole is reached, being careful, where permissible explosives are used, not to disturb the primer and the detonator leg wires.

Insistence that miners or shotfirers repair and maintain in safe operating condition connecting wires between legs of blasting caps and battery or blasting machine.

Use of no blasting cap, electric or other, weaker than a No. 6.

Study of the specific problems presented at each mine and training of those handling explosives in the drilling and cleaning of holes, in the priming of cartridges, in the charging and stemming of holes, in the operating of battery or blasting machine, in self-protection when shooting and in giving to others effective warning and time to escape from effects of blast.

Provision of good electrical returns so as to reduce stray current to a minimum.

Care that cartridges be primed always outside magazine.

Insistence that men carrying explosives into mine spread out along trip and that none of them occupy first three cars.

Provision that explosives if carried in bulk into the mine be taken in a special car with incombustible and non-conducting covers. Car should have insulated couplings and be placed three car lengths away from locomotive so that sparks from trolley will not ignite explosives. Preferably, with animal or human haulage, all electric current should be shut off.

In no bituminous mine should adobe or mud-capping shots or shots without proper stemming be permitted whether the mine be rated as gassy or non-gassy.

Requirement that legwires of all detonators shall be kept short-circuited until time to make connections to battery. The charge limit of 1½ lb. per hole must not be exceeded.

Prohibition in magazines of smoking, possession of matches or open lights and wearing of nailed shoes.

Careful cleaning of all holes before charging; where more than one cartridge is to be used in a hole, all the cartridges should be charged at the same time and pushed to the back of the hole with cartridges in contact so that no coal dust will get between them and thus interfere with their detonation.

Adequate ventilation to remove fumes and drill dust promptly.

Pump Makes Man Breathe By Moving Abdomen

What has been called a rubber lung was demonstrated April 21 before the American College of Physicians at St. Paul, Minn. A bag, like a big bustle, fits airtight over the abdomen and part of the chest and is inflated and deflated by a pump moving the abdomen in and out rhythmically, thus starting breathing. If the man has been drowned or his throat is filled with saliva, a rubber tube sucks the water out of the throat and stomach. If bones are broken in the neck or arms, this system of restoring respiration is more kindly than the Shaefer method. Some authorities say one should breathe from the stomach up. The difficulty is that the "rubber lung" is not always available where the accident occurs. The "lung" is a device of Dr. Francis Goldsborough, of the University of Buffalo, and Dr. Francis L. Wilson, of Detroit.

QUESTIONS ASKED BY STATE BOARDS

Quiz Presented Applicants for Certificates As Mine Foremen in State of Albama*

Safety Lamps

Q.—(a) When is a safety lamp considered safe? (b) Under what conditions is it possible for the flame of the lamp to pass through the gauze and ignite a gas mixture? (c) What percentage of methane does a ½-in. cap indicate? (d) What is the minimum and the maximum explosive limit of methane and air? (e) What percentage of methane and air causes the most violent explosion?

A.—(a) A safety lamp may be considered safe when it is of a type declared permissible by the U. S. Bureau of Mines, when the gauze and chimney are in good condition, when the gauze is clean and the lamp is assembled properly and the parts are right side up and in correct condition. Of course, no lamp is really safe, but is only as safe as it can reasonably be made, because any lamp may receive a blow so severe from a fall of roof or a misdirected pick that it will be shattered or damaged in a degree that will permit the flame to emerge from the lamp chimney or gauze or both. Ten faults in construction and ten in assemblage are listed by James W. Paul in Miners' Circular 12.

(b) The flame may pass through the gauze if the speed of the methane-air mixture exceeds 2,500 ft. (or about one-half mile) a minute for two minutes. A lamp dropped or suddenly lowered in an explosive mixture is likely to pass burning gas through its gauze.

(c) "Coal Mine Gases," issued October, 1919, says that a flame cap of ⅜ to ½ in. on the top of the flame in a Koehler or Wolf safety lamp shows the presence of 2 percent of methane. According to a chart by J. T. Beard, in "Mine Gases and Ventilation," 1920, there is little change in percentage of gas between those two lengths of cap. He also shows that the cap length is about ½ in. for 2 percent of gas. The observer's ability to discern the cap and estimate its height correctly has its influence on this determination. Thomas Bryson, in "Theory and Practice of Mine Ventilation," says 2 percent of gas is shown by a ¼-in. of cap, but this is a British book and the lamps and illuminant may have been different from those in use in our mines. Most authorities in their books pictorialize and chart caps rather than give actual cap dimensions.

(d) The lowest percentage of methane in normal air that will cause an explosion—by which is meant a propagation of flame, however feeble, from one place in the mixture to another when ignited—is 5 percent. The highest percentage is 15 percent (I.C. 6983). (e) The proportion of methane that will cause the most violent explosion is said to be that at which the oxygen and methane will completely combine to form carbon dioxide and water, or 9.46 percent.

Methane and Carbon Dioxide

Q.—(a) In a gassy mine how often should the air be measured, and when? (b) How often, and at what points, should samples of air be taken for analysis to ascertain methane content? (c) Which is the easier to remove, a body of methane or blackdamp, and why?

A.—(a) In any gassy coal mine, a report of the quantity of air passing in the mine, at the inlet and outlet and at or near the last crosscut in each working entry, shall be made monthly or more often, if necessary, to the chief mine inspector (Sec. 1624, Amendment of July 17, 1935). (b) The inspectors rule that air samples should be collected once each month or more often if necessary, at the outlet, at or near the last crosscut in each working entry and on the return of each split and on each main return.

(c) Because it is light, methane is difficult to remove on a pitch, except by a rising current, and accordingly it resists being caused to descend as air bubbles up through descending water. In the opposite manner, blackdamp, if carbon dioxide, resists being lifted by a rising current, but is readily carried downward. The blackdamp in a very low place tends to become carbon dioxide, for some of the nitrogen and oxygen, being lighter than carbon dioxide, are swept away, leaving the latter gas behind. If the blackdamp is excess nitrogen, and often it is mostly that, it will travel along with the air without much difficulty, for then the blackdamp may be lighter than air.

Why Air Analyses Are Desirable

Q.—(a) Would you depend entirely on the flame safety lamp, when desirous of ascertaining the true condition of the flammable gas content of the return air from each of your entries or splits? Explain fully. (b) Suppose it developed that the methane content showed between 1 and 1½ percent on any return from entry or split, what would be your procedure? (c) What is the recognized maximum safe percentage of methane: (1) in a main return? (2) in a split return? (3) at a working face?

A.—(a) and (c): I would not depend on the flame safety lamp alone to ascertain the true quantity of the flammable gas in the mine, for in Alabama, where the inspectors want the quantity of methane in the main return to be less than ¼ of one percent, and in any split return less than ½ of one percent, and in a working place not more than 1 percent 4 ft. from face and 10 in. below the roof, it is mandatory that some means better than the safety lamp be used to determine the quantity of methane, for not everyone can note the cap on a lamp flame with even 1 percent of gas present, much less ¼ of one percent. The inspectorate holds that with 1 or 2 percent permitted, the factor of safety is 5 or only 2½, as the case may be, and believes that figure to be a factor of unsafety rather than safety.

(b) If ¼ of one percent of methane or more appeared on the main return or ½ of one percent or more in any split, I would find some way of *increasing* the quantity of air or *decreasing* the quantity of methane. This latter change could be made by shutting down or slowing down extensions of headings and rooms which open up new methane-bearing coal and thus free the methane it contains.

* Continued from July *Coal Age*, p. 64.

Examination for Coal-Mine Officials State of Colorado*

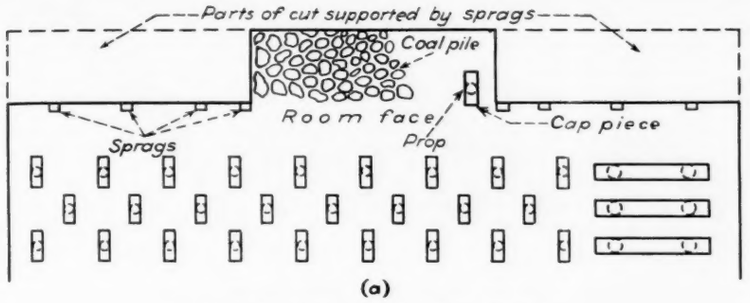
Cutting Roof Fall Toll

Q.—How would you prevent accidents from falls of roof and coal at the working faces?

A.—(1) In sections where the roof is very weak, prompt erection of temporary posts is necessary, especially at the loading point. Sometimes it is safe only to bring down the coal for a part of the face at one time, and the unsupported roof, or a part of it, must then be propped promptly as each part of the floor is freed of coal. This must be done even before the coal is entirely shoveled out of the part to be brought down. See illustration (a).

(2) Frequent testing of roof by vibration method. The roof is sounded with a pick handle, hardwood stick, steel rod or bar, with another hand held meantime against the roof. If by the sound or by the vibration of the hand, evidence is given that the rock immediately over the coal is not solidly in contact with, or attached to, the main rock

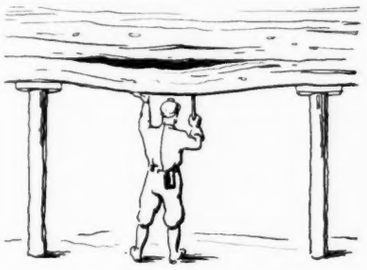
* Continued from April, 1942, p. 94.



(a)

Breaking down and propping face by sections.

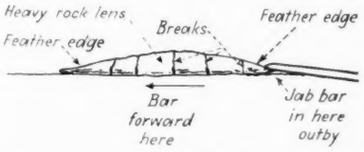
above it (or, as it is commonly stated, "is loose"), then an effort should be made to take the roof down. In thin coal, where the roof is less than 6 ft. above the floor, some men test the vibration with the head instead of with the hand. A rod held in the teeth will com-



Sounding for loose rock and feeling for vibration.

municate the vibration to the bone structure of the tester and give him an even clearer realization of the roof condition. If the rock will not come down, do not rely on that fact but post it immediately before doing anything else.

(3) In scaling the roof, use a long bar and not a pick, and bring the roof down, starting at the outer edge of the rock, which usually "feathers out" at its edges. As it is commonly expressed: "Bar forward." Keep



Bar down rock proceeding from outby to inby edge. Take care to find the edge.

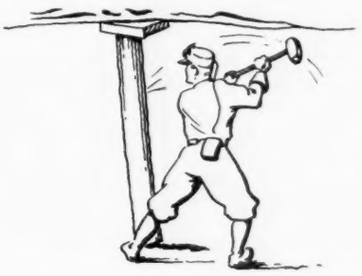
away as far as possible from the falling rock, maintain always a good footing and good balance while at this work and provide for yourself an easy and safe way of retreat in case the rock should tend to fall toward you. Avoid barring uphill. Sometimes rock can be barred from the side and on the level even when the seam is pitching heavily.

(4) Set permanent timbers according to a definite approved buleprinted system so as to provide adequate support where there are no crevices or horsebacks. Regulation No. 17 issued by the State Inspector of Mines of Colorado requires that systematic timbering meeting with his approval be strictly enforced. Cap pieces shall be used on all posts set.

(5) Under or alongside crevices, under horsebacks and where sounding gives evidence of loose material, additional timber should be used to supplement the systematic timbering.

(6) In pulling posts, use a post puller and keep away from the post being pulled. Pull posts; do not knock or cut them out, for the man who knocks out or cuts out a post tends to follow his hammer or ax under the rock which the timber is supporting. He is out of balance and can recover his equilibrium only with difficulty. Thus, he is too near or actually under the rock, and he begins to travel forward much more rapidly as soon as the post yields to his blows.

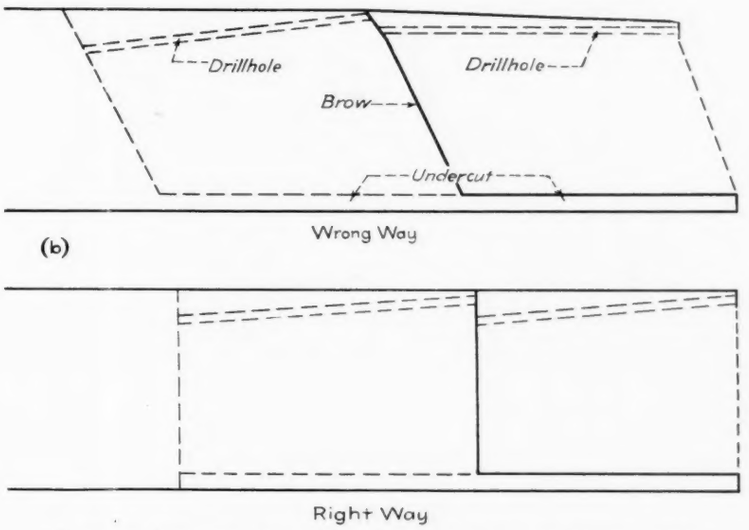
(7) All holes drilled near the roof and sides should be so positioned that they will break down the coal to the required cross section of the working face, as in illustration (b). They should "square up the face." If they do not, the coal should be squared up as soon as possible afterward. Do not drill any farther than to the proposed new face of the working; that is, do not drill the holes "into the solid," as the saying goes, and if the shot does not remove the coal to form the required cross section, scale the coal down to that section with a bar or pick. Sometimes, the coal at the face is shot so that it slopes inby, or back, from the roof to the floor, and the holes, though drilled full length at the top of the seam, fail to get to their right position at the intended new coal face; that is, the coal face, having an overhanging brow before being shot, continues to have such a brow after it is shot. Overhangs, or brows, on room faces or side ribs are likely at any time to fall and, therefore, should never be permitted.



The timberman lurches forward as he swings his hammer.

He dislodges the prop, and the inertia of his hammer carries him forward.

He gets under the rock, which falls on him and kills him.



Brows are dangerous. Once allowed to form, they may become chronic unless corrected.

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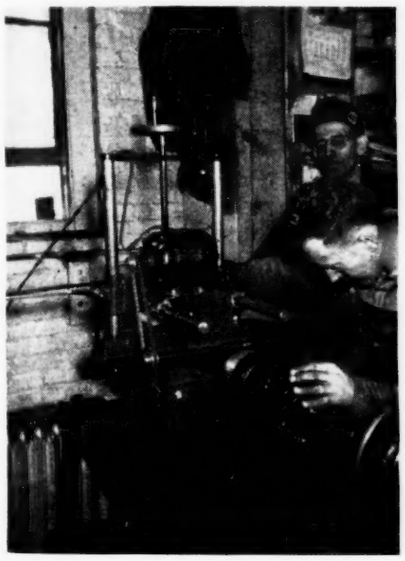
WHAT'S NEW IN OPERATING IDEAS

Precision Commutator Undercutter Built for $40

In building a precision machine from odds and ends and scrap, Clyde Pittman, chief electrician, Orient No. 1 mine, Chicago, Wilmington & Franklin Coal Co., West Frankfort, Ill., has achieved outstanding results in constructing an undercutter which is not only strong, accurate and adjustable but also far speedier than hand-manipulated cutters.

The general construction resembles a hand lathe. The bedplate is made from two



Clyde Pittman watches Frank Baudino undercut a commutator.

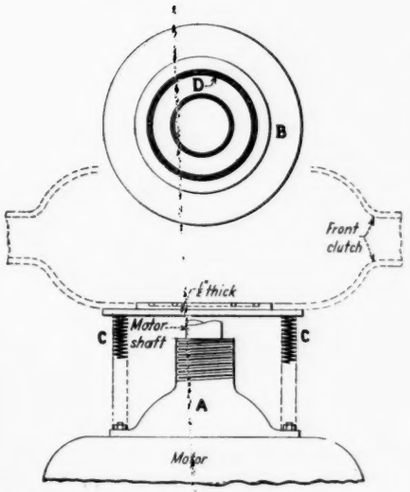
small channels: the headstock and tailstock from scrap plates and pipe, gas cut to shape and arc-welded. Even the motor came from a change in the preparation plant.

The motor and V-belted saw spindle are mounted on a rigid frame which slides bodily on two parallel round bars, attached to a vertically adjustable head. This head is mounted in like manner on the tailstock. A hand lever with adjustable stop moves the motor and saw to the work. The labor cost of this tool was about $40.

•

Grease Leaks From Clutch Case Prevented by New Seal

To prevent loss of lubricant through the joint between front-clutch case and motor on Joy 5-BU loading machines, Thomas James, mine manager, American No. 2 mine, Knox Consolidated Coal Corporation, Bicknell, Ind., offers the improvement shown in the accompanying illustration. "*B* is the new



Details of new seal-ring installation to prevent grease leakage.

seal between front clutch and motor," Mr. James writes. "The old style was threaded on the housing of the motor and was impossible to keep tight.

"We turn the threads of the motor housing, *A*, making it smooth. Seal Ring *B* is made of steel (the regular is brass). *D* is a groove cut in the face of the seal ring and filled with hemp packing (about one-half packing). A second groove also is provided to hold packing around the shaft. We cut this groove to take an axle-grease retaining ring. *C* are four 1½x3-in. springs.

"The seal ring is slipped over the motor housing and is held tight against the front clutch case by the four springs. The ideal in the latter case are automobile valve springs. We have solved the front-clutch grease problem with this idea. There is no loss, except normal due to wear."

•

Helpful Hints for Repairing Trailing Cables

"Trailing cables used on mining machines can and should be repaired as never before, as rubber-covered cables may be a thing of the past in a few months," declares J. H. Blair, shop mechanic, Katherine Coal Mining Co., Lumberport, W. Va., in offering a number of helpful hints, including a description of equipment for cutting out old splices, developed by himself.

"The repairmen in the main shop at Katherine No. 3 rebuild cables when they have been cut and spliced several times in the mine. When the cables reach the shop, the splices made in the mine are cut out and the pieces then are respliced with ordinary splice rings, soldered, taped with rubber tape and vulcanized with a vulcanizer made for that purpose.

"Cutting old splices out of the cables with hammer and chisel was slow and tiresome, which led to the development of a simple cutter that does the work well and costs very little to make. Two pieces of discarded locomotive springs—*C* and *B*, Fig. 1—were used to make the blades. A 1-in. pipe nipple was flattened at one end and welded to Blade *B*. A 1-in. pipe coupling was screwed onto this nipple, so that Handle *A* can be removed when the device is not in use. Blade *C* was welded to a piece of ½x8x12-in. boiler plate with four holes drilled through it for bolting it down on a bench. The adjustable guide, *D*, is arranged so that the blades are held together and not allowed to spring apart when cutting. The adjustment is made with setscrews (*F*, Fig. 2).

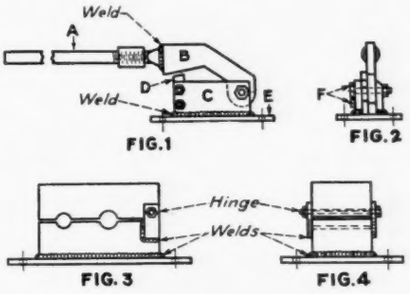


FIG. 1 FIG. 2

FIG. 3 FIG. 4

Details of device for cutting out old splices and tool for applying splicing rings.

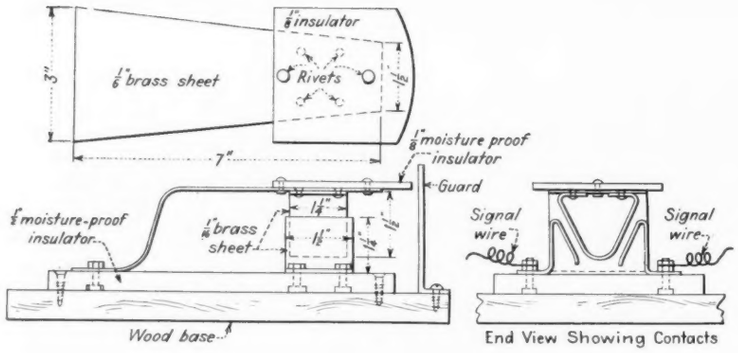
"Another tool was made for quick splicing. Two 1½x2-in. pieces 4 in. long were clamped together and two holes were drilled through the joint. The larger hole, 3/32 in., is used for starting the ring around the cable joint. The ½ in. hole is used to tighten the ring. Two good blows with a 1-lb. hammer applies a ring ready for soldering. Figs. 3 and 4 show the construction of the splicing tool and how it is bolted to a bench."

•

Ability to Take It Included In Signal Pushbutton

"The signal bell from the bottom of our coal-hoisting shaft to the engine room," writes John S. Fraser, electrician, Manitoba & Saskatchewan Coal Co., Ltd., Bienfait, Sask., Canada, "is rung about a 1,000 times per shift, and the pushbuttons at the shaft bottom had given a lot of trouble. As a result we always were experimenting with different types, with all giving the same results—about three months' service. It then was decided to design one of our own, and after some experimenting the one shown in the accompanying illustration was installed for trial.

"The results were so favorable that I thought the idea might be of interest to



Details of pushbutton construction.

others. The sketch is self-explanatory and the few dimensions given were taken from the original. Other electricians, of course, may want to vary these dimensions to suit their own needs. The contacts have a good springy wiping action, and this pushbutton has not needed one service visit since it was installed."

Going Up

Supporting the nation's victory program, coal production still is rising. At the same time things to do with are getting scarcer, forcing men around the mines to solve their problems with less material and more ingenuity. How operating, electrical, mechanical and safety men are taking care of scarcity and other questions is the theme of this department. You can do your bit—and earn a little money for War Stamps—by sending in your own kinks. Include a sketch or photo if it will help to make them clearer. For each acceptable idea, Coal Age will pay $5 or more on publication.

Greater Efficiency in Washery Operation Secured by Attention to Details

EVEN Old Man Weather takes a hand in coal-washery operation. Other problems arise from the nature of the material handled, the presence of foreign matter, corrosive acids in the coal or wash water, the difficulty of lubricating equipment under water and the multiplicity of parts. How the Sahara Coal Co. solved a number of problems growing out of these conditions at its Bankston Creek washing plant, near Harrisburg, Ill., is the subject of the following material.

Clay, fine coal and moisture built up a clinging layer of material on the main belt conveying raw coal into the plant. This broke loose as the belt passed over the return rollers and fell to the floor beneath, where it interfered with the travel of workmen. This accumulation had to be cleaned up and disposed of by hand. Robbins "Rubberdisc" return idlers were substituted for the flat-faced idlers. These permitted the material to cling to the belt until it reached the scraper where it was removed automatically. One set of the "Rubberdisc" idlers is shown in Fig. 1.

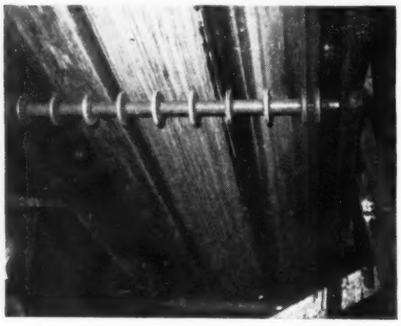


Fig. 1—These idlers cleared up a droppings problem on the main belt.

Prop ends, cap boards and other wood is received in coal from an underground operation. Wood does not crush easily and when mixed with stoker coal invites complaints. So a washery attendant worked out the idea illustrated in Fig. 2 for trapping this wood off the surface of the water in the wash box. The trap consists of a strip of discarded screen cloth fastened to an iron frame and set in the wash box at an angle of about 25 deg. so that one edge is submerged. Width of the frame and screen is about 20 in. All wood, even splinters, lodges on the screen, from which it is readily removed by hand.

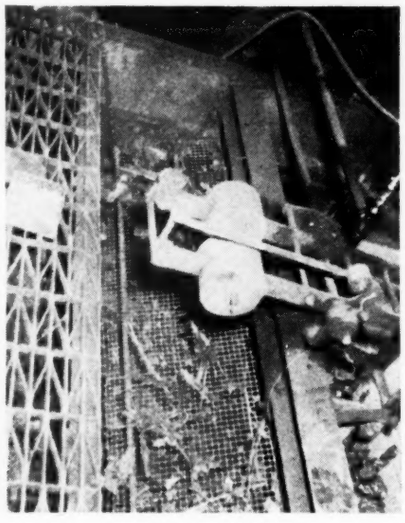


Fig. 2—Efficient wood removal is provided by this trap.

Submerged screw conveyors are difficult to keep lubricated. Corrosive wash water and fine refuse through the washer screens rapidly eroded steel and iron parts, necessitating frequent renewal of the conveyor in the bottom of the wash box. So it was decided to remove the conveyor entirely. The box has five cells, and refuse from the center cell is most difficult to remove. Water was piped in from the outside to each of the cells, in which small pipes were attached to the supply pipe to form jets (Fig. 3). These jets keep the fine refuse stirred up and moving toward the elevators.

The lump picking table at one end of the plant, as originally built, was provided with a belt conveyor to carry the refuse back to the opposite end, where it was discharged into a common refuse bin. The quantity of refuse from the lump was relatively small and there was space for an auxiliary bin directly under the picking table. So the bin (Fig. 4) was built and eliminated the belt conveyor along with its motor and upkeep.

The abandonment of worked-out mines released, among other things, some Shepard boom hoists. One of these was mounted under the bin and operates the discharge gate through a crank and connecting link. A mere push on the button makes things convenient for the truck driver, who comes

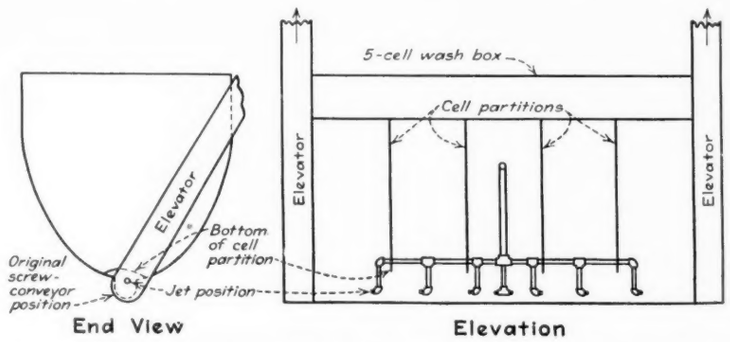


Fig. 3—Showing diagrammatically how water jets replaced screw conveyor in bottom of wash box.

TAKE a good look at this gloating scoundrel . . . our evil enemy . . . the Axis. He's smirking, but American teamwork, combining conservation *and* production, will wipe off that smile in double-quick time. But every mining engineer and maintenance expert must gear production to the limit, and conserve his vital production tools. We, as makers of Exide Batteries, urge regular battery care. Follow these simple basic rules, and—*Save to Win!*

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Fig. 4—This auxiliary pickings bin eliminated a belt conveyor.

Fig. 5—A sludge pond in an old spoil bank.

Fig. 6—Fresh-water pumping plant and line.

by occasionally to take away accumulations.

For the past two years, southern Illinois has been hard hit by dry weather, making conservation of water a prime necessity at many properties, including Sahara. Old spoil banks are pressed into service. Sludge is pumped to basins in the old spoils through an 8-in. unthreaded line connected by Dresser couplings. The couplings provide the necessary flexibility for laying the line on the surface uphill and down. The spoil, filled with loose rock and shale, makes an excellent filter, providing perfectly clear water, which is returned to the washer through a similar 6-in. line. Figs. 5 and 6 are views of these ponds and the clear-water pumping plant.

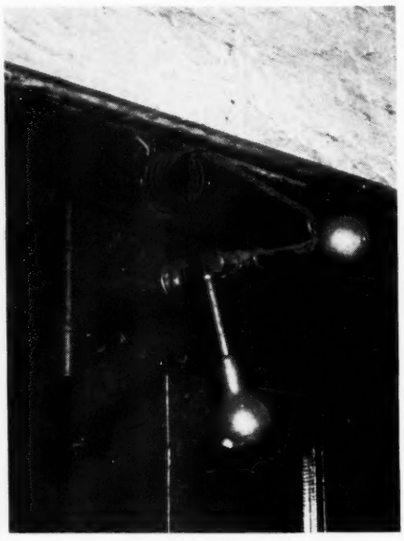
•

Power Plant Door Closers Made of Spare Parts

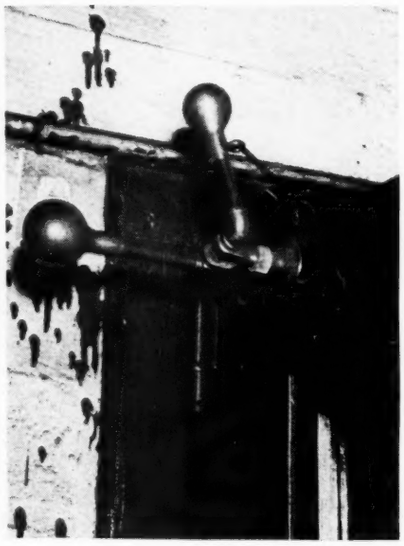
When closers were wanted on the doors between the boiler room and engine room, and between the boiler room and condenser room of the power plant at the Weeksbury (Ky.) mine of the Koppers Coal Division of Eastern Gas & Fuel Associates, the local mechanics built those illustrated at small expense from parts available in the power plant and mine shop.

The unusual design, as shown in the illustrations, consists of a 90-deg. bellcrank with offset arms having weights at the ends. The weight, which is highest when the door is closed, is $1\frac{3}{4}$ lb.—just sufficient to hold the door closed and not so heavy as to slam it shut. The other weight, which furnishes power for starting the closing of the door, must be heavier because of the angular pull of the connecting chain when the door stands open. This other weight is $5\frac{1}{2}$ lb.

The tension spring between chain and door jamb, although it does "smooth" the action of the door, is not a necessary part of the design. Pipe fittings and discarded pump parts were used in assembling these closers.



Small weight holding door closed.



Large weight starting to close the door.

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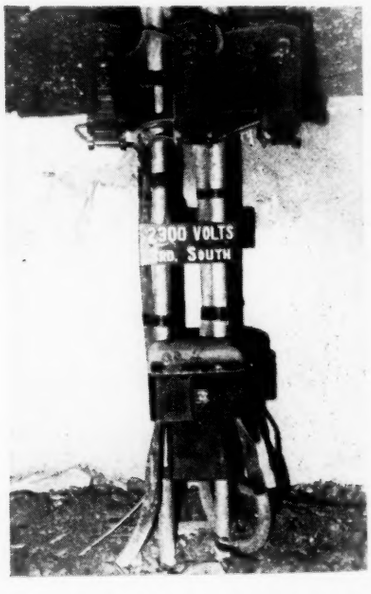
Branch-Circuit Switching Done With Breaker and Cutouts

A typical switching arrangement for a branch circuit in the 3-phase 60-cycle 2,300-volt delta-connected underground a.c. system at the Kathleen Mine, Union Colliery Co., Dowell, Ill., is shown in the accompanying illustration. Each installation, writes R. R. Richart, formerly electrical engineer for the company, consists of a manually operated three-pole single throw oil circuit breaker with one side being wired direct to the main-cable circuit. The other side is wired to the upper terminals of the fused primary cutouts. Porcelain-cased cutouts, rated at 7,500 volts, are used to provide the extra creeping distance necessary for safe operation in damp mines.

The load circuit is attached to the lower terminals of the cutouts. Fuse holders, threaded with a renewable fuse of satisfactory rating, are inserted in the cover of each cutout. Opening and closing this cutout lid is similar to the operation of a disconnect switch.



Switching arrangement for branch circuit at Kathleen mine.

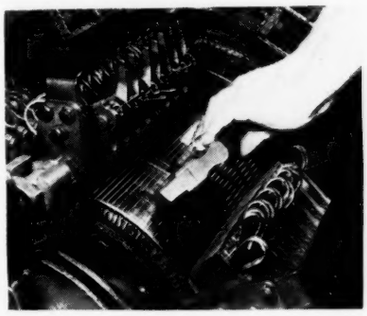
The oil circuit breaker always is tripped before a fuse is tested or replaced or when the branch circuit is not to be energized. The 2-in. pipe supports, brackets for cutouts, and the case and handle of the breaker are thoroughly grounded. The switch room usually is an old crosscut, with front and back walls of 4-in. tile. Entrance to the room is through a steel door swung from a steel casing. The room may be locked to make sure the circuit is not tampered with when cable repairs are in progress.

EQUIPMENT TIPS FROM MANUFACTURERS

For War Production and Maintenance

COMMUTATOR AND RING BURNISHER

Ohio Carbon Co., Cleveland, Ohio, offers a burnishing tool for use in the care of commutators and rings of motors and generators. To preserve the proper relation between brushes which ride a commutator and the revolving commutator itself without shutting down or dismantling motors or generators was the aim in designing the tool.



Made of non-conductive materials, this tool, according to the manufacturer, can be safely used while the machine is in operation. It consists of a wooden handle and burnishing material. Styles for all sizes of commutators and rings ranging from fractional to multiple horsepower are available. It is said to be comparatively as simple to use as an eraser.

•

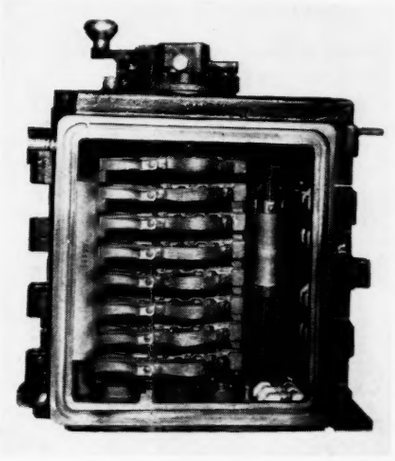
MINING EQUIPMENT

Goodman Mfg. Co., Chicago, announces the Type 1224 hydraulically controlled track-mounted slabber, said to be a fast-moving, easy-to-operate machine with a range that permits horizontal cuts from 9 in. below the rail to 8 ft. above and vertical cuts 9 ft. to either side of the track center-line. Only 34½ in. in over-all height, it is said to be adaptable to both low and high coal.

All movements of the machine are by power supplied by two electric motors—a 30-hp. unit for tramming, driving the hydraulic pumps and operating the cable reel, and a 50-hp. unit for driving the cutter chain. Both motors have pushbutton starting switches and contactor-type controllers that provide automatic acceleration.

The four hydraulic pumps that control all movements of the cutting element may be used singly or in pairs to provide the proper volume and pressure without waste of energy. Full power is available for any of the motions that are used simultaneously. A complete set of control levers for all cutting movements is located on each side of the machine; tramming controls are at the rear.

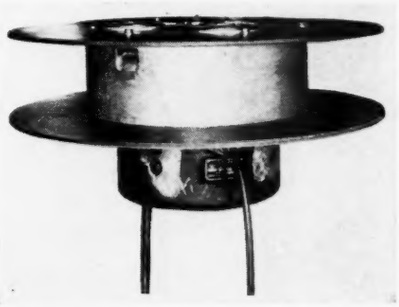
Goodman also offers the "Camtactor" controller, recently adapted to mine locomotives, which is said to be a mechanically operated unit with the same heavy contacts and individual blowout coils used on the contactor in semi and full magnetic controllers. However, instead of operating the contacts by the magnetic action of a coil, the "Camtactor" contacts are opened by cams on the drum of the controller, and closed by means



of a heavy coil spring. This positive action is said to reduce the possibility of trouble from sticking contacts; arcing is practically eliminated by the fast make-and-brake contact action and the individual blowout coil which is a part of each contactor assembly.

Designed for use with all types of locomotives up to 10 tons in weight and adaptable to any style of motor connection, the "Camtactor" controller is built in two designs, the conventional and the directional. The conventional type has two cylinders, main and reverse, with each having its own operating handle. The two cylinders are so interlocked that the handle for the main cylinder must be in the "off" position before the reverse handle can be moved. The directional type has only one cylinder and one operating handle. This allows the motorman one free hand for the brake wheel, a great help when spotting cars behind a loading machine.

A gearless vertical reel for gathering locomotives also presented by Goodman is said to be simply but sturdily constructed with a minimum number of moving parts. The in-



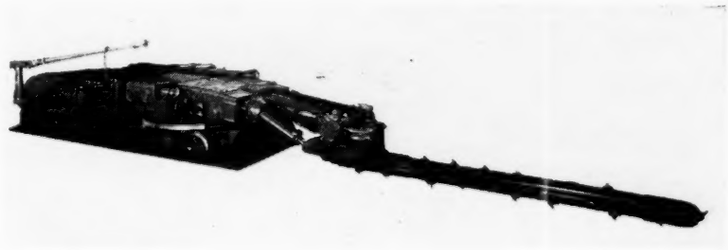
dependent motor-driven vertical reel provides automatic control of the cable; the specially designed torque motor maintains adequate tension on the cable as it is spooled off or payed on; the speed of the reel automatically accelerates or slows down in keeping with gathering requirements. There is no wasted energy or power loss due to gearing, as the motor operates with its armature shaft connected directly to the reel drum. The low height of the reel permits convenient deck mounting on even the low-vein gathering locomotives and in its vertical position cable can be payed off either end of the locomotive without reversing the drive or installing a reversible spooling device.

•

INTRUSION PROTECTION SYSTEMS

Photoswitch, Inc., Cambridge, Mass., announces an addition to its line of photo-electric protective systems, Type A28L control for outdoor and indoor use over very long ranges. The light source projects a practically invisible light beam for distances of 350 to 700 ft., and it is possible to surround completely power plants, defense factories, and other vital areas. If the light beam is broken by intruders or saboteurs, the photo-electric control contacts close, thereby sounding alarms, operating a central station system, turning on floodlights, closing gates, etc.

The control is provided with a latching unit including a pushbutton station which may be placed in the gate house, office, or other convenient point. This serves to latch the alarm in operation once the light beam



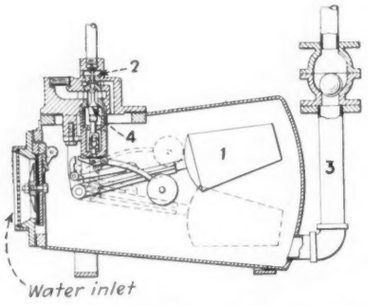
has been momentarily broken until the reset button is operated.

The Photoswitch is unaffected by changes in local light and is designed to operate 24 hours a day. The relay contacts are pure silver and will handle 15 amp. a.c. and 8 amp. d.c. Control operates from 115 volts a.c. source of supply.

•

PORTABLE PUMP

A portable pump for submerged operation is offered by the Herold Mfg. Co., Scranton, Pa. As indicated in the accompanying drawing, the water enters through the water inlet (1), which in its highest position opens the compressed-air valve (2). The air compressed as discharged forces the water through the water outlet pipe (3). The float in turn



recedes with the sinking water level, closes in its lowest position the compressed-air valve (2) and opens the air-discharge valve (4) and the water again can flow into the pump. When there is no flow the compressed air automatically is shut off.

•

NEW TYPE OF VALVE

Fairbanks Co., New York City, offers a line of Faircoseal bronze valves which contain pre-inserted rings of Sil-Fos silver brazing alloy in the port openings, instead of threads. With this design, valve and pipe can be easily brazed together into a one-piece piping assembly by the application of an oxylacetylene flame. When valves are connected to brass, copper or copper-nickel pipe, a "Silbraz" joint is formed.

Silbraz joints are designed to withstand tensions, compression, torsion, vibration and corrosion to the same degree as the pipe or tube with which they are used. These joints are silver-brazed joints, not soldered joints. They are said to have high tensile strength and will not pull apart at any temperature to which the valve or pipe can be safely subjected. The composition of the brazing alloy is such that the corrosion-resistant quality of the complete joint is said to be the same as the parts joined.

•

SMALL TURRET LATHE

A new bench model turret lathe for rapid production to close tolerances on chucking operations or bar work is offered by the South Bend Lathe Works, South Bend, Ind. This lathe has a 10-in. swing over the bed and saddle wings, $1\frac{3}{8}$-in. hole through the headstock spindle, and 1-in. collet capacity. It is well adapted to second operation work.

The hand-lever-operated bed turret indexes automatically and has an adjustable stop for each of the six turret faces. The lathe is equipped with both a compound-rest cross slide and a hand-lever cross slide, which are interchangeable. The latter is furnished with front and rear tool blocks which provide three tool positions.

A quick-change gear box supplies 48 longitudinal power feeds for the universal carriage, 48 power cross feeds for the compound-rest cross slide, and 48 thread cutting feeds, 4 to 224 per inch. The underneath motor drive and back gears deliver twelve spindle speeds, from 97 to 700 r.p.m. A large assortment of attachments and accessories simplify tooling for specialized work or second operation jobs.

•

SUBSTITUTES FOR TIN-BASE BABBITTS

Two new lead-base bearing metals, known as Pyramid and Defender, have been developed by the Magnolia Metal Co., Elizabeth, N. J., as substitutes for tin-base babbitts now so difficult to obtain.

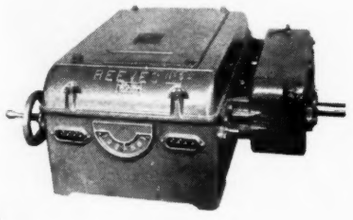
Pyramid metal is said to be well suited to applications where bearings must withstand heavy sustained pressures.

Defender metal stands shocks without cracking and is well suited for use in internal combustion engines, trap-rock crushers and sifter machinery.

•

VARIABLE-SPEED TRANSMISSION

Reeves Pulley Co., Columbus, Ind., offers a special design of the Reeves variable-speed transmission, inclosed design, equipped with built-in chain reducer and with the output shaft in exact alignment with the input shaft. Output speeds may be either increased or decreased as compared to the variable-speed shaft of the transmission, and of course



are infinitely variable, within predetermined limits, by turning the speed-control handwheel. The chain drive operates in a bath of oil.

•

FLAME CUTTING TIPS

Two additions to its line of oxyacetylene flame cutting tips have just been announced by Air Reduction, New York City. The first, known as Style 108, is for working in close quarters. It is bent in an offset shape, to permit cutting along a line $\frac{3}{32}$ in. from the vertical center line of the torch head or barrel. This offset design meets the problem of cutting close to bulkheads, flanges or shoulders where the radius of the torch head would prevent alignment of the cutting orifice vertically over the desired line of cut.

The Style 108 tip has milled flat sides, with two preheat flames, and is suitable for either machine-cutting or hand-cutting operations. It is available at present in sizes Nos. 1 to 3, for cutting steel up to $1\frac{1}{2}$ in. thick.

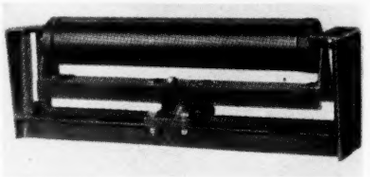
The other new addition to the line is the Style 139 straight tip with one preheat orifice, for certain machine- or hand-cutting operations. This is a companion tip to the recently announced Style 119, which carries two preheat orifices. Made in sizes Nos. 0 to 3, Style 139 is recommended for splitting angle iron, straight-line cutting using a straight edge as a guide, or sheet-metal cutting operations, in which light preheat is desired.

•

SELF-ALIGNING BELT IDLER

Chain Belt Co., Milwaukee, Wis., announces a new self-aligning idler for flat conveyor belts, both return and carrying, which it is said will help to keep the belt central on its supporting idlers, which is important for longest possible life from a conveyor belt.

Operation of this self-aligning idler is said to be sentitive and instantaneous. If for any reason the conveyor belt runs to one side it



has a tendency to swivel the idler in a horizontal plane. If this in itself is not sufficient to cause the idler to swing enough to force the belt to throw back immediately, the belt will continue traveling to one side until it strikes the counterweighted end disk, which is slightly larger in diameter than the idler roll. Contact with the counterweight tends to rotate it, but since it is a counterweight it resists this tendency to rotate and produces a counterforce on the idler. This causes the idler to swivel rapidly, throwing the idler more out of line and immediately forcing the belt to swing back the other way.

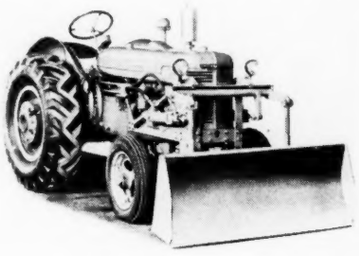
•

BULLDOZER

Baker Mfg. Co., Springfield, Ill., announces that it has developed a small hydraulic bulldozer on light-wheeled tractors which levels, grades, backfills, spreads refuse and materials, excavates and removes snow. It travels from job to job at high speed; no trailer is needed.

Model 282 is hydraulically controlled, being powered by a Baker rear-power-take off hydraulic pump unit. Blade, lifted and lowered by dual cylinders, makes 6-in. deep cut. Moldboard can be raised $12\frac{1}{2}$ in. Moldboard is 24 in. wide and 66 in. long.

Its speed, flexibility and size adapt it for



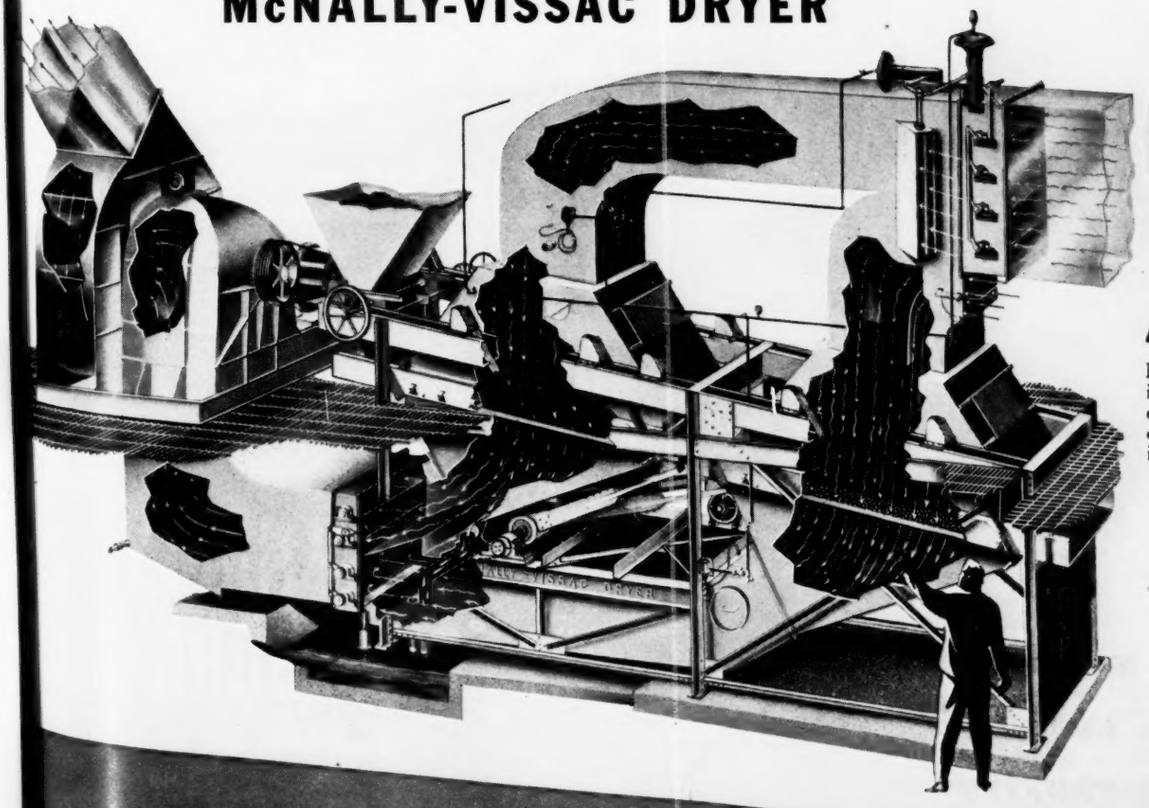
HOW TO DRY YOUR COAL AFTER WASHING

Now you can afford to dry your small sizes at a fraction of former costs with a McNally-Vissac coal dryer. Assisted by the patented pulsator as high as 50% of the surface moisture is removed mechanically. This feature continues to save fuel every day the dryer is in operation. In addition to the low cost of operation, the McNally-Vissac dryer offers these advantages. *Reduced fire hazard* . . . low gas temperatures minimize possibility of ignition. *Low power consumption* . . . approximately ⅓ horse power is required for each per cent of moisture reduction. *Automatic dedusting* . . . sizes below ½ mm are automatically rejected making output dust-free. *Wide range of sizes* . . . 2″ to ½ mm or any intermediate size without degradation. *Large capacities* . . . 50 to 100 tph per unit made possible by patented pulsator action. Further information on request, also write for Bulletin No. 940 entitled "Coal Drying." It will be sent without obligation.

50% Less Heat

Patented pulsator makes possible the mechanical removal of as high as 50% of the moisture, thereby resulting in saving in heat requirements of as much as 50%.

McNALLY-VISSAC DRYER



40% Lower Cost

Because its tph capacity is so great, the first cost of the McNally-Vissac dryer is lower. Operating costs equally low.

McNALLY PITTSBURG MFG. CORP.

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General Sales Office
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Eastern Office
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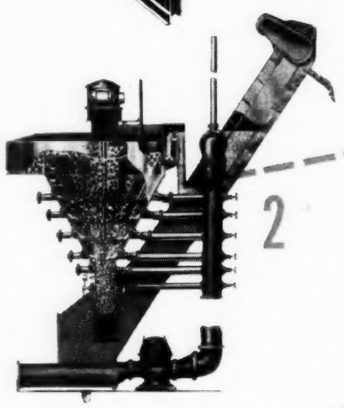
McNALLY PITTSBURG OFFERS YOU

3 types of washers

1

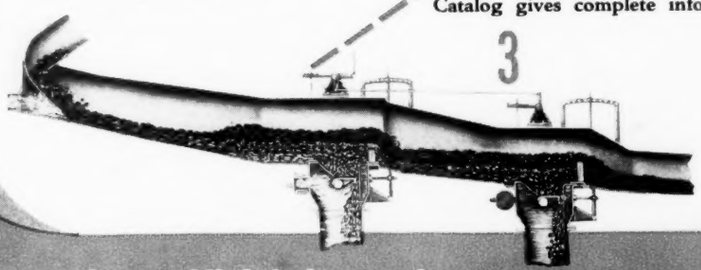
McNally-Norton Patented Washer—Accurately separates refuse from coal, providing uniform output regardless of variations in raw coal input. Available in following standard units:
Standard washers, capacity 75 to 350 tph
Compound washers, capacity 75 to 350 tph
Nut washers, capacity 25 to 300 tph
Unit washers, capacity 25 to 100 tph
Catalog gives complete data.



2

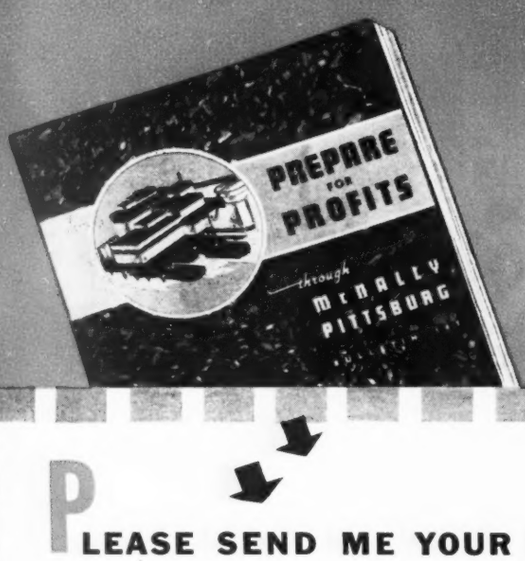
Menzies Cone Separator—Raw coal is fed into a cone. Water currents from a series of nozzles keep the coal in suspension. Refuse sinks to bottom and pure coal is floated over a baffle. Complete operating data given in the catalog.

McNally-Rheo Launder—Coal and refuse are automatically separated by stratification in the water stream. Washes coal up to five inches, although the efficiency is unsurpassed on fine sizes. Catalog gives complete information.



3

Actual installations with production figures are shown. Phantom illustrations of the important units of equipment demonstrate the principle of operation, which is explained in detail in the text. This valuable book is free. Mail the coupon below.



Every operating official in coal mining should have this 48-page book containing important operating data not found in a catalog

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Rio de Janeiro, Brazil

use in mines for mucking and for conveyor feeding and for use on open-pit mines and quarry floors for clean-up and shovel-feeding work.

•

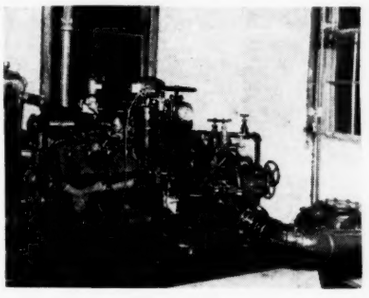
SWEAT PADS

W. S. Wilson Corporation, New York City, offers Drybrow sweat pads, made of special cellulose sponge said to absorb 20 times its weight in perspiration. They have a one-piece adjustable headband which is self fitting to any head size. According to the manufacturer, they eliminate goggle fog, stop brow mopping, can be washed and worn repeatedly, make it easy to wear goggles or glasses, and help to prevent accidents due to sweat-impaired vision.

•

SPECIAL DUTY PUMP UNITS

Fire-pumping units developed by Fairbanks-Morse & Co., Chicago, now afford small plants and towns adequate fire protection at a moderate cost. One of these is composed of a 4-in. Figure 5813 F-M driven



by a Ford-Mercury engine. The Mercury engine drive, turning at 2500 r.p.m., is of sufficient speed to be direct-connected, eliminating the expense of gear drive necessitated when a slow-speed engine is connected to a high-speed pump.

•

FURNACE DOOR

A new type of furnace access, inspection, and clean-out door for boilers, incinerators, etc., has been announced by the Plibrico Jointless Firebrick Co., Chicago. A feature of this door is the Lock-Tite handle, which locks the door so tightly that all infiltration of excess air around the door is said to be eliminated. The handle operates on a cam and lever principle so that the further the handle is depressed, the tighter the door is forced against the frame.

The door is lined with Plicast L-W-I lightweight insulating refractory material, which reduces the weight of the door, protects the metal from the heat and decreases the radiation of heat into the boiler room.

•

INSULATION AND BREAKDOWN TESTER

The Model 520 insulation and breakdown tester, offered by the Superior Instruments Co., New York City, features a super-sensitive danger indicator which lights up to indicate leakage up to 1,000 megohms (1,000,000,000 ohms). Four voltage sources are available: 250, 500, 1,000 and 2,500 volts. No hand cranking and no adjustments are necessary. To use, simply connect the two test leads to the circuit, appliance or motor to be tested, then throw the switch. The danger indicator will instantly light up to indicate defective insulation or insulation which, because of its excessive leakage, indicates a potential or imminent breakdown.

The Model 520 will also indicate "shorts" and "opens" and as a safety feature includes a jeweled pilot lamp on the front panel which indicates when high voltage is on. The instrument is housed in a portable carrying case with compartment for test leads and a specially designed cover attached in a jiffy assures complete portability. Operates on any 90- to 125-volt 60-cycle a.c. line.

Tightness in the Available Oxygen Supply Requires Care in Its Conservation

"IT IS ALMOST inevitable that in the rapid expansion of oxyacetylene welding and cutting there should be a period when wasteful practices are prevalent," says the Air Reduction Sales Co. in offering tips on its conservation. "Furthermore, the wholesale addition of thousands of inexperienced operators has considerably aggravated this condition. There is no question that the conscientious welder or cutting operator is concerned about eliminating waste when he knows its source. This article, therefore, is intended to serve as a check-list that will help all concerned in preventing a serious oxygen supply situation from becoming critical.

"Keeping war production industries supplied with an unceasing flow of oxygen and acetylene for welding and cutting is no less essential than providing the metals needed for production. Demand for these gases has increased enormously. For some time gas manufacturers have been hampered in their efforts to meet this demand by a shortage of cylinders to transport the gases. Now, there has arisen another source of concern. The oxygen-producing capacity of the oxyacetylene industry is being strained to the fullest extent in attempting to keep abreast of constantly pyramiding oxygen requirements. In spite of additions to and expansions of oxygen and acetylene plants a critical situation faces this industry—and all industries consuming these gases—unless efforts are made by everyone to conserve, particularly in the use of oxygen.

"A survey has revealed a considerable number of shop practices which might be disregarded in peace time but which today must be considered wasteful. These habits of

Close cylinder valve when finished to prevent hose leakage.

Check tip size. If number is not clear check with cleaning drill.

Check hose periodically for leaks.

Watch the pressure. Keep pressure chart handy and use it.

FIRST THINGS - *First!*

For peak efficiency, start with the right lubricants—and let a Cities Service lubrication engineer lend a hand!

Sure you have problems—plenty of them! Production quotas jumping sky-high . . . and Uncle Sam yelling for more, more—and faster! Machinery going full blast. Men working in three shifts, day and night—without a let-up. And all the worry about breakdowns and stoppages . . . about costly repairs and man-hours lost.

Problems? Brother, you sure have your share!

But wait. Let's look at first things —*first*. Let's get down to what's basic. . .

The right lubricants, designed especially for your job, will help you meet your quotas—efficiently, economically, and on schedule.

And that, Mr. Mining Operator, is one phase of your business a Cities Service lubrication engineer knows how to handle. He has the experience and the indispensable "know-how." Let him study your set-up and recommend a lubrication plan tailor-made to your requirements.

Let him help you to go *all-out* for Victory with no *time-out* for repairs. Remember that continuous, efficient operation is the only way to achieve the maximum production Uncle Sam demands. And in the end it also will mean dollar-and-cents economy to you.

Just drop us a line on your letterhead requesting that a lubrication engineer call. There is no obligation, of course.

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ARKANSAS FUEL OIL COMPANY
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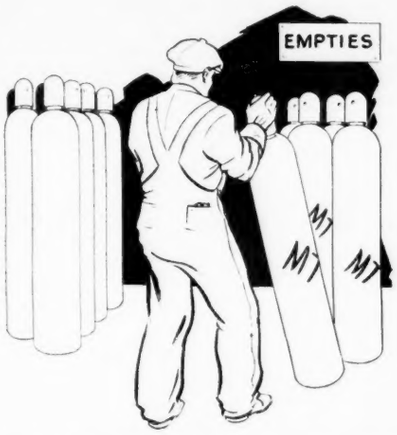
Cities Service Special Coal Mining Machinery Lubricants

Loader Greases	Steam Cylinder Oils
Compressor Oils	Cable Compounds
Car & Journal Oils	Gear Lubricants
Ball & Roller Bearing Greases	Hydraulic Oils, Etc.

A LUBRICANT FOR EVERY INDUSTRIAL NEED

Long hose is cumbersome and requires more pressure. Use short lengths.



Keep cylinder inventories low. Order fewer at a time and oftener.

Return empties promptly.

yesterday, being largely unconscious, can be remedied only by a re-evaluation of the significance of such seemingly trivial practices as using the wrong-sized hose or torch tip or open a full cylinder when a quarter-full cylinder stands idle.

"The following list of recommended practices is based upon observations of correctible conditions in oxyacetylene welding and cutting shops. The elimination of wasteful practices will not only go a long way toward relieving the 'tight' oxygen situation and insuring an uninterrupted supply of gases, but will also prove economical to the individual shop where such conditions prevail. One shop, for example, was found to be unconsciously wasting approximately 25 percent of its oxygen consumption through an accumulation of 'insignificant' losses.

"1. *Use the proper-sized torch tip.* A No. 2 tip used instead of a No. 1 for cutting $\frac{1}{2}$-in. plate consumes 10 to 20 percent more oxygen, 16 percent more acetylene—all wasted.

"2. *Do not use excessive pressures.* This, one of the most common malpractices, is usually done by inexperienced operators who believe they thereby get a more efficient flame, or to save a trip to the pressure chart. Manufacturers' rated pressures are the most efficient for average conditions. And when more speed is desired the new high-speed machine-cutting tips cut faster without consuming additional oxygen.

"3. *Close cylinder valves when torch is not in use.* If only the torch valves are closed, gas pressure in the hose rises and may force leaks. If leaks already are present or if new leaks are forced, considerable gas will be lost.

"4. *Check hose and connections for leaks.* They may be infinitesimal, but a $\frac{1}{64}$-in. diameter leak in hose operating at 100 lb. will waste 290 cu.ft. of oxygen in 24 hours—more than a tankful. The hose should be checked periodically by immersing it in water while under pressure to show up leaks. Soap and water will reveal leaks at connections.

"5. *Use correct-diameter hose.* Hose that is too small for the job requires a higher gage pressure to secure sufficient flow, causing unnecessary strain and promoting leakage in the hose.

"6. *Use short lengths of hose.* Unnecessarily long hose also requires a higher pressure to overcome pressure drop in the hose. Also, the surplus lengths, though useless for the job, are subjected to unnecessary wear and tear.

"7. *Use all the gas in each cylinder before connecting a new one.* Use every cylinder for all it is worth before disconnecting it. In the larger shops interruptions of work to change tanks can be eliminated by manifolding gas cylinders or by installing pipe lines.

"8. *Keep cylinder inventories low.* The old custom of keeping plenty of reserve cylinders must be abandoned as it 'freezes' them at a time when rapid turnover is imperative. Gas suppliers are cooperating by providing frequent deliveries. You can help by ordering fewer cylinders oftener and by keeping reserves of cylinders at a minimum.

"9. *Return empty cylinders promptly.* Idle cylinders are production slackers.

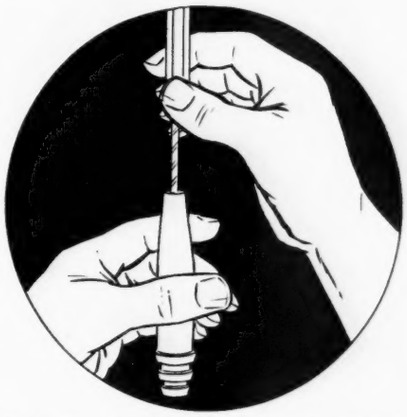
"10. *Don't leave torches burning when not in use.* It may seem troublesome to be constantly relighting the torch but if it burns idly for even as little as three minutes out of each hour it is wasting 5 percent of its gas consumption. Five percent of last year's industrial oxygen consumption was 360,000,000 cu.ft. Let's use those 1,636,000 tankfuls for welding and cutting, not for heating the air.

"11. *Keep tips clean and free from carbon and slag.* An unclean tip is an inefficient tip and, like any dull tool, is abhorrent to the skilled workman. Congested orifices nullify the value of using proper pressures and speeds, resulting in lower efficiency and consequent waste of gas.

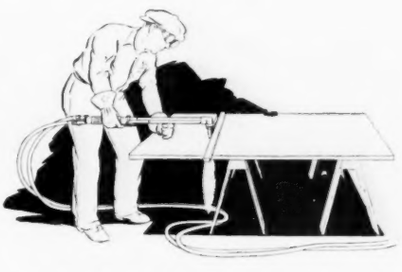
"12. *Don't abuse cylinders.* A damaged cylinder must be taken out of circulation. It contributes nothing while undergoing repairs.

"13. *Hose—handle with care.* Because hose is made of rubber it is most important that it be made to last as long as possible. To insure this it must be protected against mistreatment which promotes leaks. Therefore, keep hose out of range of hot oxide

Don't let torches burn unused.



Keep tips clean. Keep cleaning drills handy and use them.



Keep hose clear of sparks and slag.

and sparks; wash off oil and grease, which ruin rubber; place a plank on each side of the hose where it crosses truck runways; store any hose stocks in a cool, dark place; and when a hose is damaged cut out the bad portion and splice the ends together with standard splicing nipples.

"Essentially, these suggestions involve but one basic concept—to uproot yesterday's habits to meet today's demand. None of the recommendations is difficult to accomplish provided we open our eyes to every-day practices which should no longer be tolerated. Industry needs many waste wardens; they may be unofficial, they may be self-appointed but if they watch out for wasteful practices among themselves and their co-workers they will be performing a very real service."

•

Factors Underlying Performance Of Carbon Brushes

"The commonly accepted idea of the factors that govern brush performance from the standpoint of life and commutation," declares A. A. Stark, chief engineer, Ohio Carbon Co., "is based on a misconception of the underlying phenomena, and this first of a series of talks will be devoted to listing the physical and electrical characteristics of brush materials with a brief outline of their worth in determining the proper material for a given application. Future talks will take up each of these in turn and endeavor to show what influence each characteristic has upon commutation and life. The order of listing follows the popular conception rather than the true order of importance.

"1. *Hardness* has no relation to wearing qualities and only a slight relation to the other properties of the brush material, with the slight exception of density, and is governed by the type of material and process used in manufacture.

"2. *Material* can be grouped into three general classes: carbon, graphite and metal. Actually, there are many kinds of each general type of material used and the combinations of these materials coupled with many manufacturing processes are endless.

"3. *Resistivity*, commonly given as resistance per inch cube, is of value in itself only to determine heat losses, and actual carrying capacity is a function of contact drop.

"4. *Abrasive factor or cleaning action.* There are very few brush materials made that contain any abrasive material as such and the appearance of abrasion is due mostly to misapplication of other properties of materials.

"5. *Contact drop* is the most important single characteristic of any brush material and is the determining factor as regards carrying capacity and suitability of a material for specific application. It is influenced by many things other than the material in the brush.

"6. *Density, or specific gravity*, is dependent upon the material used, but the usual term, "apparent density," is based on mass and weight and is of great value to the manufacturer in process control and of little or no value as far as use of the brush is concerned.

"7. *Wear, or life, of brush materials* is not a function of hardness or kind of materials used and, barring a few special kinds made to achieve an object, there is practically no mechanical wear to the brush. The wear that takes place in service is due almost solely to the passage of the current through the contact face and is electrical, or electronic, in nature.

"8. *Friction* is mainly mechanical and is influenced by certain properties of materials used and speed and pressure but also to a marked degree by the passage of current.

"9. *Pressure*—the most neglected and the most vital factor contributing to good brush performance after the proper materials have been chosen by a competent authority."

•

Industrial Notes

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has appointed S. H. Mortensen, chief electrical engineer of its plants at West Allis, Cincinnati, Boston and Pittsburgh. Starting at the Norwood works in 1905, Mr. Mortensen transferred to Milwaukee as an electrical draftsman three years later. There he successively became design engineer for d.c. machines, design engineer for rotating synchronous machines, and in 1932 engineer-in-charge of a.c. design.

Pomona Pump Co., Pomona, Calif., has elected as treasurer C. Granniss Bonner, formerly comptroller and more recently treasurer of the Brunswick-Balke-Collender Co. of Chicago. He relieves Donald C. McKenna, vice president and former treasurer, who will devote full time to the increasing production activities of the company's four manufacturing plants.

R. G. LeTourneau, Inc., Peoria, Ill., has appointed Murray M. Baker to the newly created post of executive vice-president. He enters on his new duties immediately and will make his headquarters at the Peoria plant. The new post was created to enable R. G. LeTourneau to devote a greater share of his time to the increased engineering activities made necessary by the war work of the company's four plants in Peoria, Ill.; Tournapull, Ga.; Vicksburg, Miss., and Stockton, Calif.

Worthington Pump & Machinery Corporation, Harrison, N. J., was awarded a Navy "E" pennant on June 26 for excellence of production. Rear Admiral Henry A. Wiley, U.S.N., retired, made the presentation, and Hobart C. Ramsey, vice president in charge of operations, accepted on behalf of the Worthington organization. Other speakers were Mayor Frederick J. Gassert of Harrison, and Leslie C. Ricketts, Harrison works manager.

Stewart-Warner Corporation, Chicago, has elected Lynn A. Williams, Jr., a vice president. In his new position he will continue all his former corporation duties as secretary and head of the legal department.

DeLaval Steam Turbine Co., Trenton, N. J., was awarded the Navy "E" burgee, symbol of "Work Well Done," on June 29, at which time also the employees received the "E" lapel insignia. The award was for outstanding achievement in the production of turbines, gears, pumps and other equipment vital to the United States Navy. The presentation speech made by Rear Admiral William C. Watts, U.S.N., retired, was responded to by H. L. Watson, executive vice president of the DeLaval company.

Plants of the American Steel & Wire Co., U. S. Steel subsidiary, at Worcester, Mass., have been awarded the Navy "E" for excellence in production. Rear Admiral Wat T. Cluverius, U.S.N., retired, made the presentation to C. F. Hood, company president. Four veteran employees of the company also received Navy "E" buttons to symbolize award of the honor to all of the Worcester district employees of the company.

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Trade Literature

Centrifugal Pumps—Worthington Pump & Machinery Corporation, Harrison, N. J. Folder W-310-B11 gives specifications for standard Type CY centrifugal pumps, single-stage, open-impeller, belt of motor drive, for pumping hot or cold water, brine, light oil, drainage, process waste and similar liquids.

Coupling — Precision Development Co., Salisbury, Md. Pamphlet describes Fast's "Flexaline" coupling, giving utility factors for various kinds of machines connected by these couplings; also power ratings, dimensions and weights of couplings.

Cutting Tools and Blanks—McKenna Metals Co., Latrobe, Pa. Catalog 42V, covering specifications and prices of Kennametal steel-cutting carbide tools and blanks, contains illustrations of each standard type Kennametal tool, showing typical applications of each style of tool. Several pages are devoted to selection and design of tools and blanks, chip breaker designs, correct grinding, boring tool set-ups and other engineering data.

Dryers—Hardinge Co., York, Pa. Bulletin 16-C describes Ruggles-Coles dryers, made in nine distinct types, each said to embody the latest developments in design, fabrication and metallurgy. Dimension, performance and data tables are included.

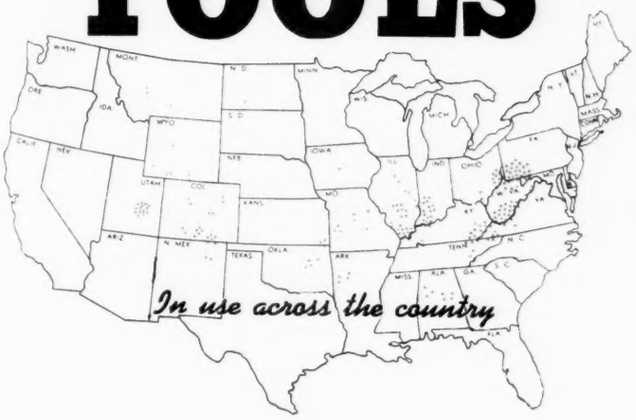
Roller Attachment for Power Grader Austin-Western Road Machinery Co., Aurora, Ill. Leaflet AD-1955 covers bulldozer attachment and roller attachment for the Austin-Western "99-M" power grader, giving specifications.

Simplified Print Making—Ozalid Products Division, General Aniline & Film Corporation, Johnson City, N. Y. Booklet explains the Ozalid process of making dry-developed, positive-type whiteprints. The aim has been to write the text in easy-to-understand language, which would interest engineers, draftsmen and architects.

Tail Pulley — Sprout, Waldron & Co., Muncy, Pa. Bulletin 3001 describes and illustrates the "Belt Saver" tail pulley. Complete table of sizes, weights and prices is included.

TOOLS *that add speed to* COAL *Production*

COALMASTER TOOLS



COALMASTER TOOLS certainly help out, particularly today when we are all producing for Victory. They drill straight holes without choking and clean holes without scraping—drillers do not have to fuss and fight the equipment to get the work done.

There is accurate alignment of these tools from thread bar to tool point. That means COALMASTER TOOLS run smoothly and give workers time to relax while the drill does the work. The safety angle is one of the things that appeals to drillers. Mines are doing their fastest drilling since they standardized on COALMASTER. The coal is broken and chipped out, not pulverized.

COALMASTER TOOLS are made in types for hand-held drills—for post and machine mounted drills—for strip pit drills. Sizes are available for holes from 1½" to 16" dia. This is an organization of drilling specialists and we are prepared to work with you to your greatest advantage.

Our representatives will be glad to help you increase your coal production.

SEND FOR LITERATURE.

LONG RANGE PLANNING A BIG ASSET IN VICTORY PRODUCTION

Advance inventory estimates made now not only will help us to serve you for your later drilling needs but also will give full cooperation to W. P. B. Simply give us the facts on your drilling. Metal scarcities and the possibility of delays in deliveries are reasons why such planning action on your part is so important. Write today.

CENTRAL MINE EQUIPMENT CO.

ST. LOUIS, MO.

"The Drill Bit People"

YOU MUST MAKE YOUR TIRES *Outlast* THE JAPS!

● The trucks you and thousands of other truck owners and operators use are vital war weapons. Without them, the all-important job of making America strong would come to a disastrous standstill.

The rubber we now have in America must not only fill military needs, but must also keep hundreds of thousands of essential motor vehicles rolling *for the duration.* Every ounce of rubber—whether crude, reclaim, scrap or *tires-in-use*—is more precious than gold!

That's why you *must* make your tires outlast the Japs. You can do it by remembering these 4 points:

1. **Drive only when necessary; conserve vehicle and tires.**
2. **Whenever possible, share transportation; pooling saves rubber.**
3. **Drive under 40 miles an hour; speed burns up rubber.**
4. **Check tires for proper inflation at least once a week. Have a reliable service man check wheel alignment, brakes, and tire casings regularly. Seiberling Distributors offer this mileage-doubling Protectire Service.**

KEEP YOUR TIRES FIGHTING FOR AMERICA!

HEAT-VENTS ON SEIBERLING WARTIME TRUCK TIRES PROTECT YOU AGAINST RUBBER-DESTROYING INTERNAL HEAT!

For the war's duration, the government has standardized specifications for ALL tire manufacturers. That makes all truck tires about as much alike as peas in a pod—all but the Seiberling Heat-Vented Truck Tire. To save rubber for Victory, this wartime tire retains its famous Heat-Vents. They *expel internal heat*—the cause of more tire failures than all other factors combined.

Do everything possible to keep your present tires rolling. But when you must have new ones, use your ration certificate for the war-time truck tire that has protection against dangerous internal heat.

SEIBERLING

Heat-Vented **TRUCK TIRES**

V Save Rubber For VICTORY

MAKE YOUR TIRES OUTLAST THE JAPS!

Ask your Seiberling Distributor about Protectire Service

MORE NEWS FROM THE FIELD

Expansion Program Launched By Crows Nest Pass Co.

Crows Nest Pass Coal Co., operating in British Columbia, Canada, has announced a program of expansion involving large capital expenditures and providing employment for about 750 additional men. H. P. Wilson, president and general manager, stated: "We have commenced an expansion program at an approximate cost of $1,528,000. This covers the opening of a new colliery, to be known as the Elk River, about four miles from Fernie, and construction of ten Curran-Knowles byproduct coke ovens at Michel. Our coal production for 1941 was 1,072,274 tons. Our coke output was 94,027 tons, compared with 66,961 tons in 1940."

•

Strip Mining for Oklahoma

Strip-coal mining in the field around Porum, Okla., is to be developed to furnish a minimum of 100,000 tons of coal annually. The Leavell Coal Co., of Tulsa, has taken the contract and has been notified that it should be prepared to furnish 200,000 tons of coal. The Leavell company is developing the district around Porum and will start work immediately.

•

U. M. W. Wins at Low Moisture

Miners at the Low-Moisture Coal Co., Providence, Ky., have voted to be represented by the United Mine Workers. At an election held on July 15 by the National Labor Relations Board the U.M.W. polled 28 votes to 17 for the Progressive Miners of America. At a previous election neither union received a majority.

•

Modify Wood Preservatives To Meet War Needs

In order to conserve chromium, copper and phenol compounds for vital war uses, emergency federal specifications for wood preservatives were issued early in July by the U. S. Forest Products Laboratory and the Federal Specifications Committee, at the instance of the War Production Board. The emergency formulas are offered as war-time substitutes, to be used where they will serve as suitable alternates to the standard chrome-bearing compositions, for preservative treatment of lumber for military, war-plant, and shipbuilding needs.

The specifications offer two formulas. One is a 50-50 mixture of borax and boric acid; the other contains equal parts of sodium fluoride, sodium arsenate, borax and boric acid (very similar to Wolman salts except that the borax and boric acid replace chromate and dinitrophenol). Both Wolman salts preservative and chromated zinc chloride—the two preservative compositions in widest use—will be affected. No substitute for coal-tar creosote is specified. However, provision has been made to relax federal requirements for creosote purity during the emergency, since many treating plants are having difficulty in obtaining high-purity creosote.

Keeping Step With Coal Demand

Bituminous Coal Stocks

	Thousands Net Tons June 1 1942	P.C. Change From May 1 1942	P.C. Change From June 1 1941
Electric power utilities	15,854	+ 7.4	+76.3
Byproduct coke ovens	9,176	+ 9.1	+92.1
Steel and rolling mills	1,099	+ 4.7	+49.1
Railroads (Class 1)	11,473	+ 6.1	+87.0
Other industrials*	23,007	+11.1	+91.9
Total	60,609	+ 8.7	+86.0

Bituminous Coal Consumption

	Thousands Net Tons May 1942	P.C. Change From April 1942	P.C. Change From May 1941
Electric power utilities	5,101	+8.1	+ 3.8
Byproduct coke ovens	7,451	+3.9	+ 8.5
Steel and rolling mills	819	−5.1	− 2.1
Railroads (Class 1)	9,394	+2.2	+12.1
Other industrials*	11,731	−6.8	+ 8.4
Total	34,496	−0.1	+10.5

*Includes beehive ovens, coal-gas retorts and cement mills.

Coal Production

Bituminous

Month of June, 1942, net tons	48,410,000
P.c. change from June, 1941	+11.8
January-June, 1942, net tons	285,440,000
P.c. change from Jan.-June, 1941	+24.3

Anthracite

Month of June, 1942, net tons	5,133,000
P.c. change from June, 1941	+1.2
January-June, 1942, net tons	29,518,000
P.c. change from Jan.-June, 1941	+9.7

Sales of Domestic Coal Stokers Vs. Oil Burners

	Coal Stokers	Oil Burners
May, 1942	4,722	2,697
P.c. change from May, 1941	−67.3	−85.7
January-May, 1942	39,228	37,262
P.c. change from Jan.-May, 1941	−11.8	−45.9

Index of Business Activity*

Week ended July 18 (preliminary)	183.3
Percent change from month ago	+ 0.98
Percent change from year ago	+13.5

Business Week, July 25.

Electrical Power Output †

Week ended July 18, kw.-hr.	3,565,367,000
Percent change from month ago	+ 3.8
Percent change from year ago	+11.4

†Edison Electric Institute.

Anthracite Research Measure Passed by Senate

Creation of a research laboratory in the Pennsylvania anthracite region is provided for in a bill passed by the Senate and sent to the House at Washington on July 7. The experimental laboratory would conduct research and investigation relative to mining, preparation and utilization of anthracite with a view to conserving resources for national defense, to finding new uses and markets, and to advance the safety and health of workers.

Senator Davis (R., Pa.) succeeded in putting through an amendment on the floor raising the authorization from $350,000 to $450,000, with the approval of the Mining Committee, headed by Senator Joseph Guffey (D., Pa.) and the Bureau of Mines. The Bureau of Mines, under which the laboratory would operate, would have $175,000 annually for maintenance. Harold L. Ickes, Secretary of the Interior, would appoint a six-man advisory committee representing coal operators, workers and the public.

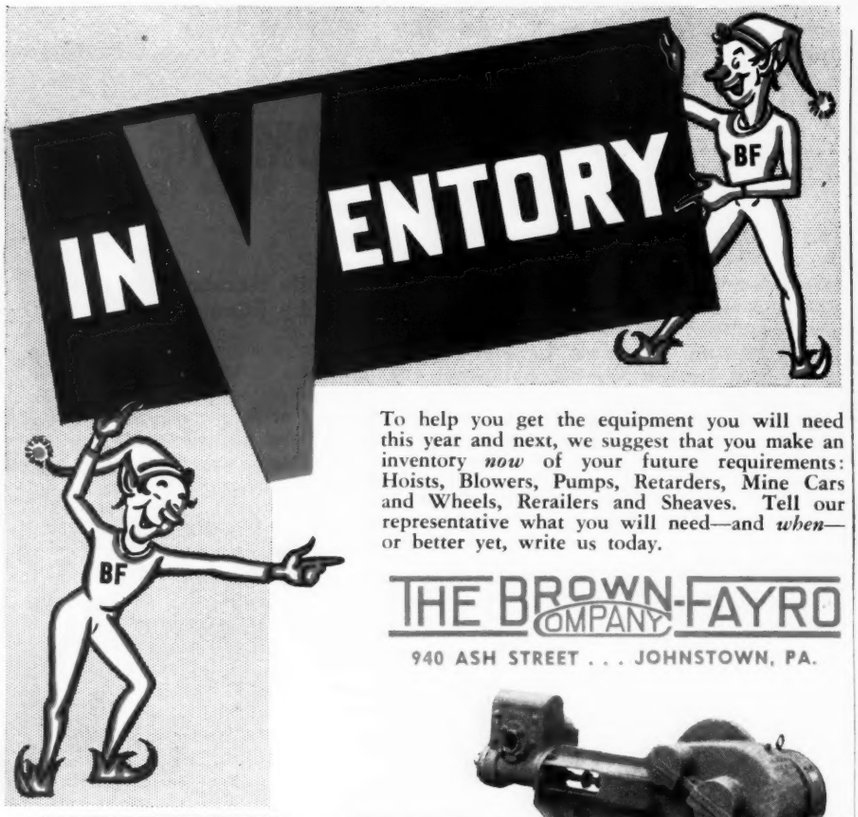
The measure was introduced in the Senate a year ago, soon after a similar proposal was offered in the House by Representative Ivor D. Fenton (R., Pa.), a resident of the southern Pennsylvania anthracite fields. Mr. Davis, Mr. Fenton and Mr. Guffey were members of the President's special anthracite commission which studied conditions in the hard-coal area and recommended such a laboratory.

•

Coal Used in Soil Conditioner Planned for Eastern Output

Preparations for the manufacture of a soil food and conditioner using processed slurry, bone coal, refuse, etc., in place of the usual fillers are now being carried out by V. R. Shattuck, Pittsburgh, Pa., licensee for the product and process for the 36 states east of the Rockies. The product has been manufactured for several years by the Occidental Seed Co., Salt Lake City, Utah. Arrangements now are being made for one manufacturing unit to go into operation in the East this fall, it is reported, and plans call for licensing several others at strategic points in the 36 states.

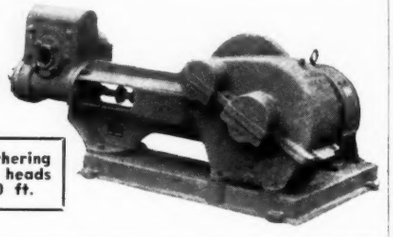
Standard percentage fertilizers, it is stated, are made with varying percentages of water-soluble plant food (nitrates, phosphates and potash) mixed with inert fillers, such as sand, etc., the filler sometimes running as high as 84 percent of the product. In the present process, low-grade or waste bituminous coal supplants the inert filler, in combination with limestone and other suitable materials. The percentage of coal may run 30 to 50 percent, it is reported, depending upon the type of use to which it is put. Three separate types of material, in varying



To help you get the equipment you will need this year and next, we suggest that you make an inventory *now* of your future requirements: Hoists, Blowers, Pumps, Retarders, Mine Cars and Wheels, Rerailers and Sheaves. Tell our representative what you will need—and *when*—or better yet, write us today.

THE BROWN-FAYRO COMPANY

940 ASH STREET . . . JOHNSTOWN, PA.



5 x 6 Gathering Pump—for heads up to 250 ft.

See our Catalog Data in COAL MINING CATALOGS

ELIMINATES HAND SWITCHES

It changes the current from trolley to reel automatically, eliminating shocks and burns to the operator. Built for 250 and 500 volts, for either single or double trolley and reel service.

INCREASE PRODUCTION AND PROMOTE SAFETY

THE POST-GLOVER ELECTRIC CO.

• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI, OHIO

competitive price ranges, are now being made in the western plant and sold in 1-, 10-, 25-, 50- and 100-lb. paper packages, the smaller for home gardeners and the larger for agricultural applications.

The 1940 consumption of fertilizer approximated 8,000,000 tons, and consequently a substantial market is foreseen for the product, which is made with the usual percentages of nitrate, phosphate and potash in addition to coal, limestone, etc., which serve as active soil-building aids and also contain rare minerals regarded as essential for a healthy soil. The new product, therefore, is said to be 100-percent usable, supplying not only the important plant foods but also balanced proportions of humic material (from coal) and rare elements, promoting the necessary bacterial growth for a live soil.

Equipment necessary for the preparation of the coal used in the product is stated to be the usual crushing and grinding machinery, conveyors, storage bins and auxiliaries, plus a small rotary kiln similar to a coal-drying kiln. The coal must be heat-treated in the manufacturing process, hence the kiln.

•

Pooling of Steam Tonnage Considered in Illinois

A proposal for the pooling of steam tonnage as a means of enabling Illinois and other mid-continent operators to meet the growing demands from war plants for fuel was reported to be under consideration last month. The idea was stated to be the formation of a new office to receive each day and post the steam-coal no-bills from participating operators. With this information, an operator temporarily short would be able to determine without delay where he could obtain additional supplies to fill pressing orders.

•

Utilities Elkhorn to Expand

Expenditure of more than $150,000 for development of its Pike County (Kentucky) coal, gas and oil properties has been approved by the Utilities Elkhorn Coal Co., according to John E. Bowman, general manager of the company. Twenty-five thousand dollars is to be used to double the capacity of the Boldman No. 5E mine, Boldman, with employment of 35 additional men. An aerial tramway 1,000 ft. long is to be constructed. The remainder of the money is to be used for development of 1,200 acres of gas and oil lands near Virgie, 8 miles south of Pikeville, where plans call for sinking seven or eight wells.

•

Gob Explosion Kills Seven

An explosion in a refuse pile and ensuing slide which swept away certain dwellings is reported to have caused the deaths of seven people July 20 at the Oakwood (Va.) mine of the Oakwood Smokeless Coal Co. The explosion was attributed to the formation of gas in the burning refuse pile as a result of

Keep 'Em Running!

To keep the enemy on the run, it is imperative that we keep our fighting forces supplied with all necessary equipment. Enormous quantities of steel are required for guns, planes, tanks, ships and shells. The more service you can get out of your wire ropes, the more steel you save for these other vital purposes. . . So, the longer you can keep your ropes running, the faster will be the flight of the foe.

Whether or not a wire rope gives the full service of which it is actually capable, depends largely upon the conditions under which it is required to work—unfavorable or improper conditions mean shorter life; to save steel, give your ropes the same kind of a chance you are now giving your tires.

For the benefit of all wire rope users we have published a 44 page illustrated booklet entitled, "Practical Information on the Use and Care of Wire Rope". It contains information that will help all wire rope users get more "work hours" from every pound of their wire rope steel. We shall be glad to supply a complimentary copy upon request.

Another important factor in getting maximum service from wire rope is the use of the correct grade, construction and type. On all problems of this kind, feel free to consult our experienced Engineering Department.

A. LESCHEN & SONS ROPE CO.

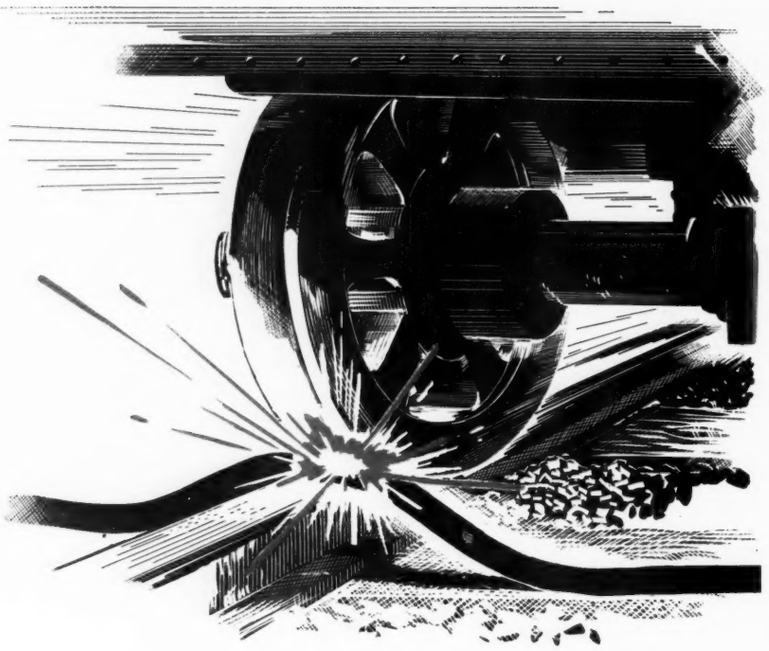
WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

HERCULES (RED STRAND) WIRE ROPE

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South



AID TO THE AXIS!

Yes, you're helping Hitler and his cohorts every time you let a car wheel or other heavy object pass over a trailing cable. Mine workers must take the same care of cables today that our soldiers take of their guns. For rubber and metal shortages make cable hard to get. Yet mine production is more vital than ever before.

Don't help Hitler! Handle your cables carefully. If they do get damaged, have them repaired promptly and properly. Keep them out of mine water as much as possible; dry them thoroughly before reeling up.

JOHN A. ROEBLING'S SONS COMPANY

TRENTON, NEW JERSEY Branches and Warehouses in Principal Cities

JAR ROEBLING

ROEBLING MINE WIRES AND CABLES HAVE ENLISTED FOR THE DURATION!

* * * PROMPT SHIPMENT TO MEET ESSENTIAL NEEDS * * *

ROLL 'EM UNDER

RETURN REELS AND SPOOLS PROMPTLY

ROEBLING

ELECTRIC WIRES AND CABLES

weather conditions. A similar explosion also was reported in a refuse pile at another operation in the same region, but no damage or injuries resulted.

•

S. H. Ash Elected New Chairman A.I.M.E. Anthracite Section

Officers elected at the annual meeting of the Pennsylvania-Anthracite Section of the American Institute of Mining and Metallurgical Engineers, June 27, at the Hazleton Country Club, Hazelton, Pa., were S. H. Ash, district mine inspector, U. S. Bureau of Mines, Wilkes-Barre, Pa., chairman; E. V. Evans, general superintendent, Lehigh Navigation Coal Co., Lansford, Pa., vice-chairman; Floyd S. Sanders, assistant district manager, Goodman Manufacturing Co., Wilkes-Barre, Pa., secretary-treasurer. The

S. H. Ash

executive committee members serving for three years are Cadwallader Evans, Jr., vice president and general manager, Hudson Coal Co., Scranton, Pa.; H. D. Kynor, general manager, East Bear Ridge Colliery Co., Hazleton, Pa.; L. D. Lamont, division superintendent, Philadelphia & Reading Coal & Iron Co., Pottsville, Pa.; D. C. Helms, mining engineer, Lehigh Navigation Coal Co., Lansford, Pa., and Edward Griffith, vice president and general manager, Glen Alden Coal Co., Wilkes-Barre, Pa.

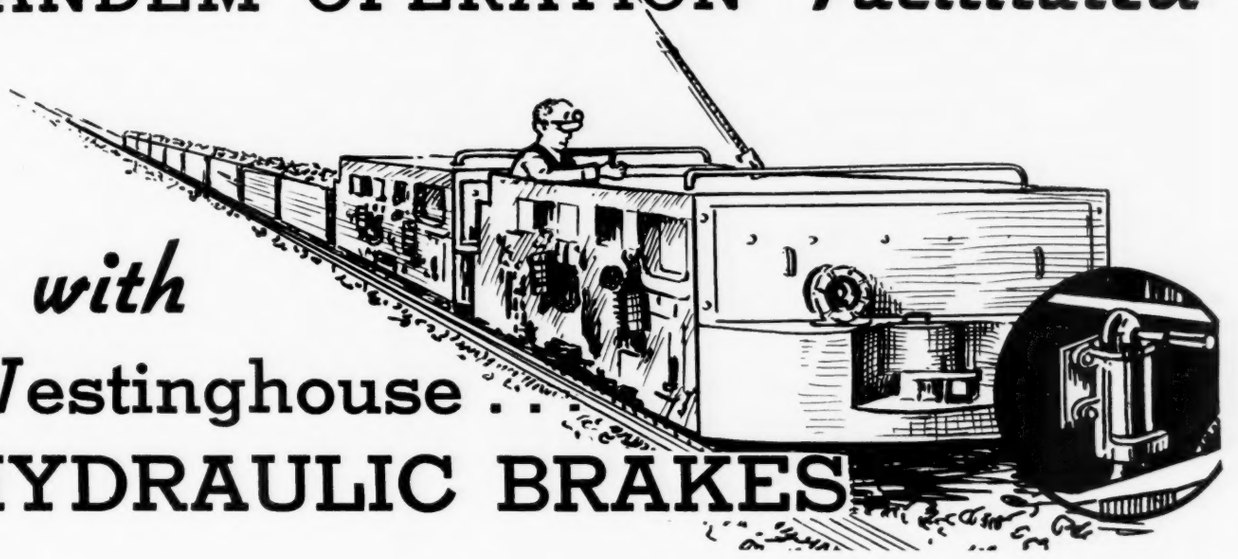
At the banquet, following a golf tournament, A. B. Parsons, secretary of the institute, spoke; Jack Edwards, Exeter colliery, Lehigh Valley Coal Co., related mining stories, and Raymond Bogardus, John A. Roebling's Sons Co., gave an exhibition of magic.

•

20 Die in West Virginia Blast

An explosion on July 9 caused the deaths of 20 miners in the No. 2 mine of the Pursglove Coal Mining Co., Pursglove, Monongalia County, West Virginia. The blast occurred while the late afternoon shift, which reported for duty at 3:15, was at work.

TANDEM OPERATION *Facilitated*



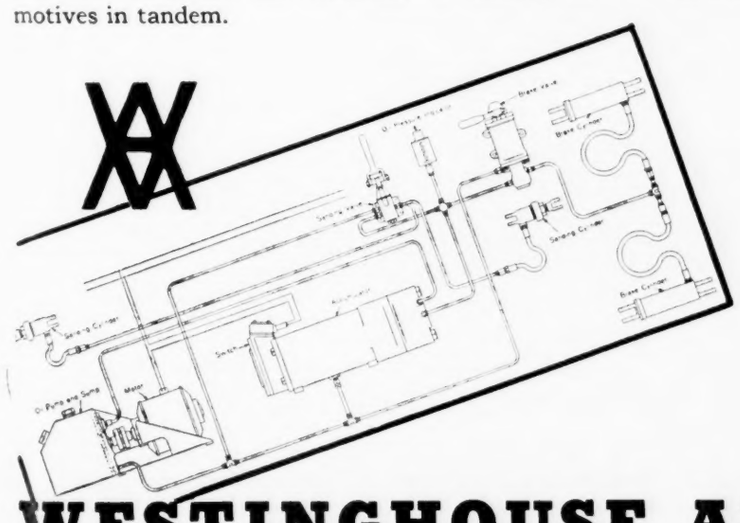
with Westinghouse . . . HYDRAULIC BRAKES

A means of control far superior to that of the common hand brake is provided for small mine locomotives by Westinghouse Hydraulic Brakes . . . Fast, flexible, and effortless manipulation of the power in high pressure hydraulic fluid thus displaces a laborious, slow-acting, and coarse manual control.

When two locomotives are coupled together the hydraulic system provides both locomotives with brakes, which function simultaneously in response to manipulation of an operating valve on the head unit. Such a provision may, in many cases, be the one factor that will determine the feasibility of running locomotives in tandem.

Westinghouse Hydraulic Brakes help to increase the productivity of hauling facilities. Locomotives, either single or double, are thereby made more maneuverable. Spotting of cars at loaders can be speeded up. Uniform safety for capacity loads over tracks of varying profile at time-saving speeds is made possible.

An outstanding feature of this equipment is the Brake Valve—unique in principle and design. The braking force developed is directly proportioned to the degree of operating handle movement. Manipulation is effortless, and response instant. Graduations on or off in small increments can be made at will.



The Westinghouse Hydraulic Brake is a simple system, easily installed on small locomotives, new or old, where limited space precludes use of compressed air brake apparatus. For permanent tandem coupling the only apparatus required in addition to that shown on the diagram, are two brake cylinders with pipe connections and fittings.

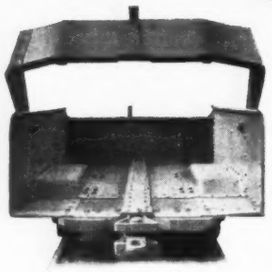
WESTINGHOUSE AIR BRAKE CO.

INDUSTRIAL DIVISION - PITTSBURGH, PA.

We also build the following for mine service ★ Compressed Air Brakes for larger locomotives ★ Air Compressors, motor-, belt-, or steam-driven ★ "Savair" Cocks for air lines—efficient, durable ★ Air Storage Tanks—many types and sizes ★ "Flexair" Valves, for pneumatic control on shovels, hoists, etc.

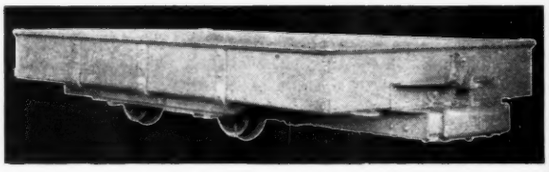
DOING THEIR PART
FOR THE INDUSTRY'S 1942 GOAL OF
660,000,000 TONS

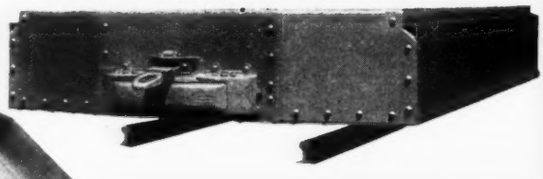
P·S·C
ALL-STEEL MINE CARS



Keep in step with the victory program. Boost *your* tonnage — cut *your* maintenance. With P·S·C All-Steel Mine Cars in your operations, you're always sure of dependable, continuous production for the duration!

Illustrated are but a few of the many types of P·S·C *All-Steel Mine Cars. For details on the complete* P·S·C *line write for Bulletins 66 and 71.*





PRESSED STEEL CAR CO., INC.
(INDUSTRIAL DIVISION)
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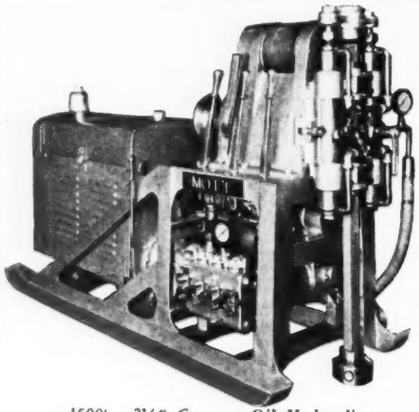


1500' - 2¼" Core — Oil Hydraulic

DIAMOND
CORE DRILLING
CONTRACTORS

Specializing in Testing Coal Properties. We Guarantee Satisfactory and "PROPER COAL CORES"

•

Inside Mine Drilling

•

Pre-Grouting for Mine Shafts

•

Wells and Discharge Holes Drilled and Grouted.

MOTT CORE DRILLING CO.
Huntington, W. Va.

The last body was removed about 24 hours after the explosion.

An inspector's report to the State Mines Department indicated that little damage to the mine was caused by the explosion and fire. Company officials said that 70 employees were in the mine when the disaster occurred. About a year ago this mine received a U. S. Bureau of Mines award for producing more than 3,000,000 tons of coal without a fatal accident.

•

Analyses and Heat-Value Checks Debated by Testing Society

A statistical study dealing with the precision attainable in analyses of coal and coke involving over 32,000 analyses made by 19 organizations, each working on 176 samples of the same material, was presented by H. H. Lowry and C. O. Junge Jr., director and staff member, respectively, Carnegie Institute of Technology, at the 45th annual meeting of the Society for Testing Materials in Atlantic City, N. J., June 22 to 26, in a conference of Committee D-5 on Coal and Coke.

In discussing the results, W. A. Selvig, supervising chemist, U. S. Bureau of Mines, declared that the present permissible difference of 0.2 percent in the determination of volatile matter might well be increased, as such uniformity could not be assured even with the greatest of care, but that in determinations of calorific value, the proposed variations of 0.5 percent would be excessive, differences of 0.3 percent being the present permissible variation.

It is reasonable, according to Dr. Selvig, to allow a larger permissible variation in duplicate determinations for sulphur by the bomb-washing method than with the Eschka method, for though the former method may be quite precise, it is not as foolproof as the old reliable Eschka method. Sufficient care in washing the inside of the bomb sometimes is not taken.

Variation Not Surprising

In the study, Dr. Selvig added, the ash-fusion tests made a good showing of uniformity, but a great variation was observable in the results obtained in the determinations of carbon and hydrogen percentages. The latter was not surprising, said Dr. Selvig, as they require a high degree of manipulative skill and good condition of the combustion train, both of which are difficult to attain if determinations are made at irregular intervals.

The British crucible swelling test for coke was declared in a paper by H. N. Ostborg and H. R. Limbacher, research engineers, and R. A. Sherman, supervisor of fuels, respectively, Battelle Memorial Institute, to be an advantageous method of determining the swelling characteristics of coal when it is free to expand, inasmuch as no complicated apparatus is required and because the result easily can be duplicated in the same and in different laboratories. The coal button resulting is large enough that the difference in expansion between quite similar coals can be detected. In discussion, O. W. Rees, chemist and head of the analytical division, Illinois Geological Survey, said that

the test had been used for years in this country for predicting the coking tendencies of coals when used in domestic underfeed stokers.

This British test consists essentially of heating a gram of coal in a covered silica crucible with the flame of a gas burner so adjusted as to give a temperature of 800 deg. C. plus or minus 10 deg. in 1½ minutes and 820 deg. C. plus or minus 5 deg. in 2½ minutes. The heating is continued for not less than 2½ minutes or until the flame of the burning volatile matter has disappeared. The coke button obtained is compared with a series of standard outlines, numbered one to nine, in steps of half numbers, and given a value corresponding to that of the nearest outline.

•

Hillman Prepares to Reopen Black Diamond Mine

Preparations are being made by the Hillman Gas Coal Co. to reopen the Black Diamond mine, near Monongahela, Pa. An application has been made to U. S. engineers for permission to construct a river tipple coal-loading facility, consisting of two ice breakers and walkway with supports. There also will be a conveyor and support piers, one guide pier and six mooring clusters. Tipple and ice breakers will be of pile and timber construction.

•

Wage Contract for One Year Signed in Nova Scotia

Wage contracts involving about 11,000 mine workers employed by four major Nova Scotia coal companies were signed on July 14 by company officials and the executive board of district No. 26, United Mine Workers. District President D. W. Morrison said the new agreements, based on those expiring last Jan. 31, would continue in force for one year.

Wage agreements were reached with the Dominion Coal Co., Acadia Coal Co., Cumberland Railway & Coal Co. and Old Sydney Collieries, Ltd., at a meeting with William Sneed, International U.M.W. representative, attending. The basic rate for Dominion Coal Co. employees, who comprise the majority of district members, is $3.90 daily plus a cost-of-living bonus. Wage rates of the other three companies are slightly lower.

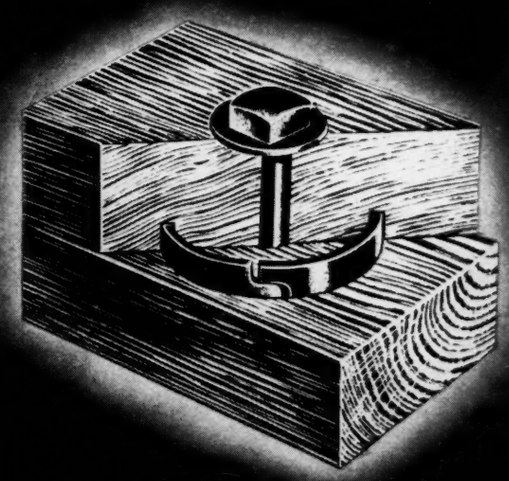
Meanwhile, Sneed advised U.M.W. officials that a contract referendum, proposed by several Cape Breton locals to ascertain the membership's opinion on the matter, would be illegal under the U.M.W. constitution.

•

Montevallo Mine Closed

The Montevallo Coal Mining Co. has permanently closed down its Mintevallo mine at Aldrich, Ala., and all equipment has been placed on sale. Said to have been in operation continuously for about 110 years, it was probably the oldest coal development in Alabama. D. A. Thomas, president of the company, is at present chairman of District 13, Bituminous Coal Producers Board, with offices in Birmingham.

This timber joint
DOES MORE – COSTS LESS



For more than 8 years TECO Timber Connector Construction has been tested by the U. S. Forest Products Laboratory and at many leading universities. The TECO Timber Connector brings into play the full stamina of each framing member by spreading the load on a joint more equally over the cross-section of the wood.

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Send full data on Timber Construction with TECO Connectors.
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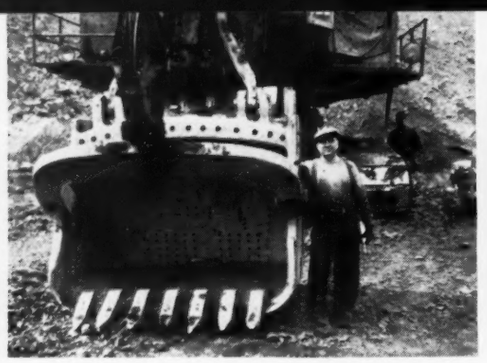
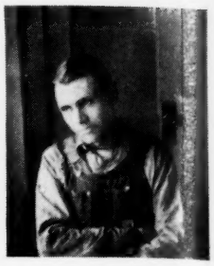
COAL MEN ON THE JOB



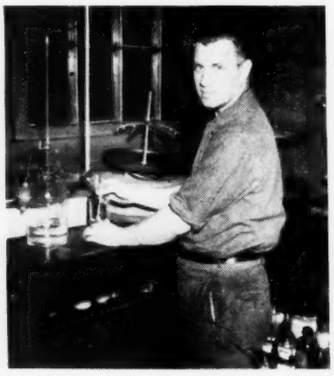
Charles Lewis, shovel runner, Southwestern Illinois Coal Corporation, Percy, Ill., is proud of the 3,500,000 tons of coal this 7-yd. dipper has loaded.

Henry O'Keith, Southwestern Illinois Coal Corporation, lubricates the loading shovel.



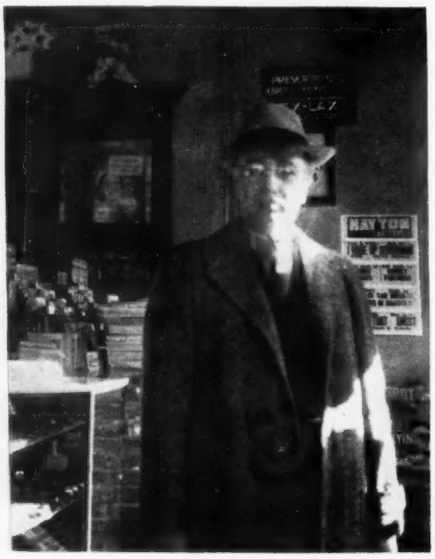
Ray Bridges, chemist, Southwestern Illinois Coal Corporation.

Frank Clark, chief electrician, and Charles Burch, pit foreman, Southwestern Illinois Coal Corporation, discuss a problem in pit operation.



E. B. Jolly, preparation engineer, Weirton Coal Co., Isabella, Pa.

Phil Quigley, top foreman, Franklin County Coal Corporation, No. 5 mine, Herrin, Ill., rests for a minute.



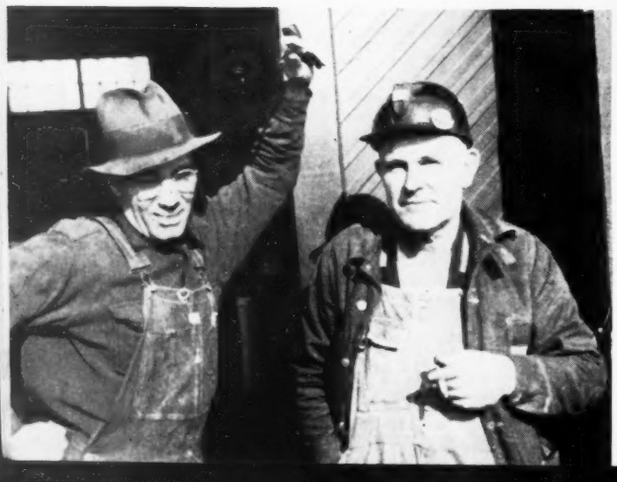
Jett West, traveling auditor, Peabody Coal Co., returns to his boyhood haunt, the hometown drug store.

Fred A. Miller, general manager, Franklin County Coal Corporation, at his work desk, Mine No. 7, Royalton, Ill.

Clyde Pittman, chief electrician, Chicago, Wilmington & Franklin Coal Co., Orient, Ill.

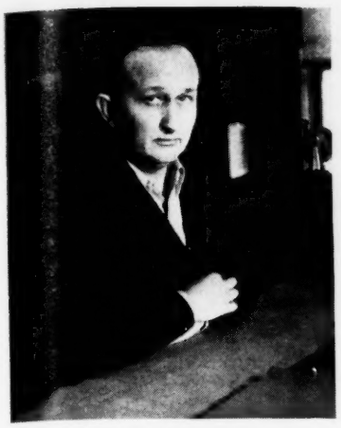
Frank Baudino, electrician, Chicago, Wilmington & Franklin Coal Co., works out a new idea.

Roy Roark, maintenance electrician, Union Colliery Co., Dowell, Ill.

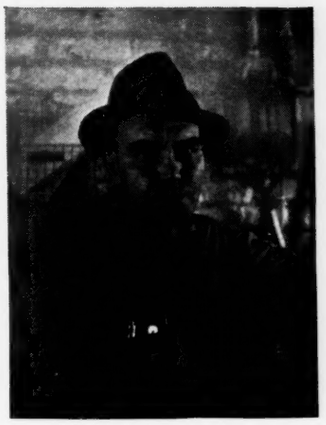


Ora Sheffler, electric shop foreman, and Jack Lloyd, master mechanic, Chicago, Wilmington & Franklin Coal Co., New Orient mine, West Frankfort, Ill., take a two-minute vacation.

BY EDITORS ON THE JOB

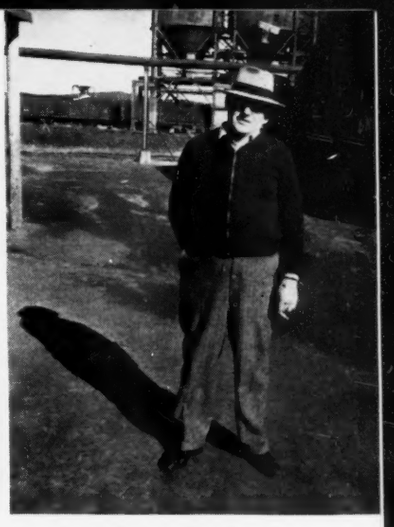


Harry Hicks, store keeper, Bell & Zoller Coal & Mining Co., Mine No. 1, works, rain or shine.

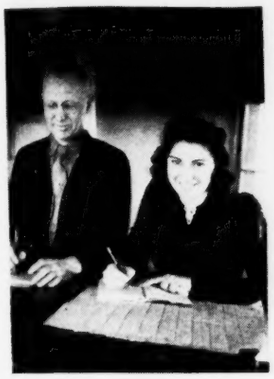


Hector Hall, chief electrician, Mine No. 2, Bell & Zoller Coal & Mining Co., Zeigler, Ill.

Sid Holland, hoisting engineer, Mine No. 1, Bell & Zoller Coal & Mining Co., since 1913, sports new gloves.

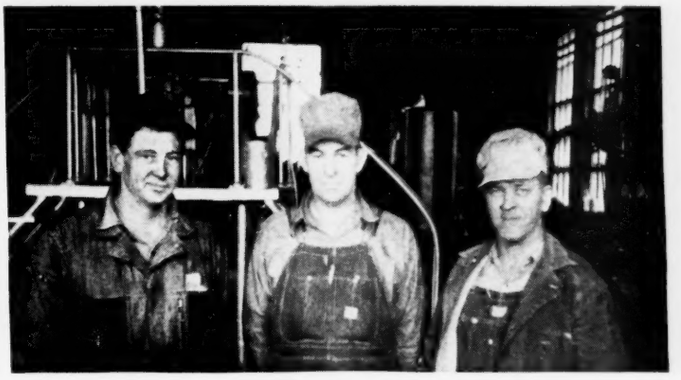


Ernest Prudent, superintendent, No. 1 mine, Bell & Zoller Coal & Mining Co.



F. L. (Boots) Felts, chief clerk, and Geraldine Kirk, assistant, Freeman Coal Mining Co., Herrin, Ill.

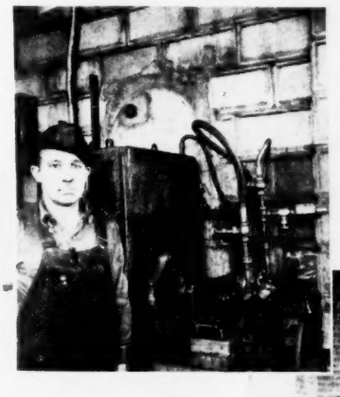
Roland Wilson, superintendent, Freeman Coal Mining Co., takes advantage of an idle day.



Paul Kirk, chief electrician; Charles Greeney, second engineer, and Charlie Musgrave, first engineer, Freeman Coal Mining Co., pose for a picture.

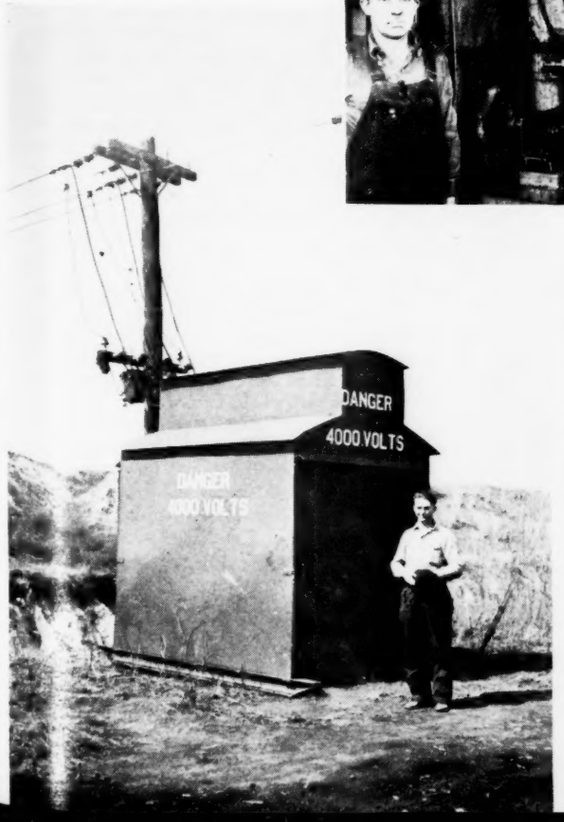
Bill Tipton, electrician, Princeton Mining Co., Princeton, Ind.

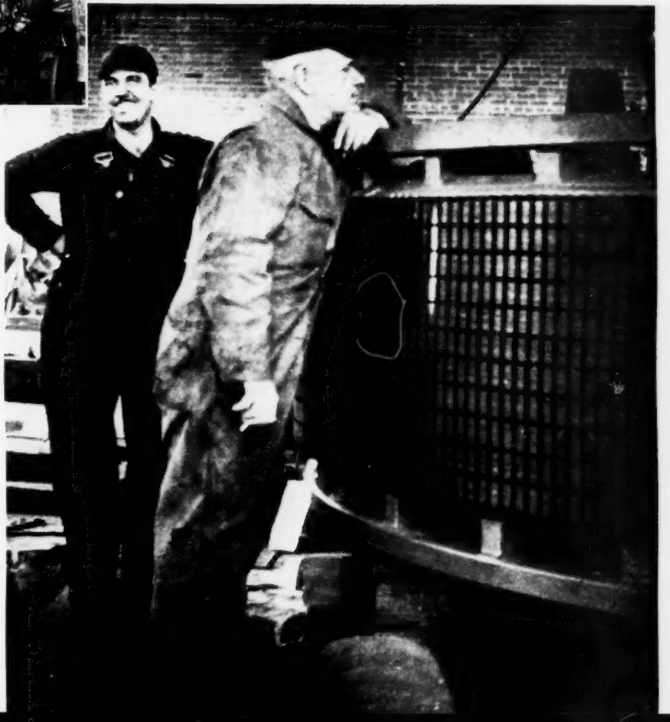
Joe Daffron, chief electrician, Pyramid Coal Corporation, Pinckneyville, Ill., and one of his all-steel welded switch houses.



John ("Buck") Connelly, chief electrician, Consolidated Coal Co., Nason, Ill., poses for a picture.

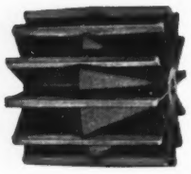
Ed. Lutz, chief electrical and mechanical man, (right), Old Ben Coal Corporation, West Frankfort, Ill., supervises a big job.





BELTSAVER

THE EXCLUSIVE MONARCH



Wing Type

TAIL PULLEY SAVES

ELEVATOR AND CONVEYOR BELTS

"Beltsaver" is as far ahead of the open face pulley as a B-19 Bomber is ahead of the "flying piano boxes" of World War I. "Beltsaver" is especially recommended for use as an elevator boot pulley on conveyor tail pulley when handling sand, gravel, stone, ore, ashes, coal and similar sharp, abrasive materials. Users report belt life increases of from 50% to 100% over that which they obtained when using a solid face pulley. "Beltsavers" are made in standard sizes and are interchangeable with solid face pulleys.

COMPARE:

Ordinary Type Solid Face Pulley

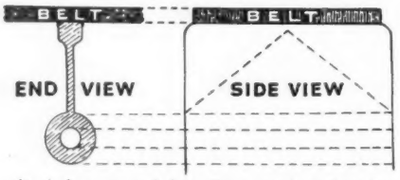
. . . in the under side of the solid face pulley causing extensive damage.

WITH "BELTSAVER"

Wing Type Tail Pulley

ONLY 20% OF PULLEY PERIMETER TOUCHES BELT

Note the cross sectional end and side elevators. End view of rounded wing (Left Below) shows contact with belt. Face surface of these wings is wide enough to pull without harm to belt, and because they represent less than 20% of the total pulley perimeter, "Beltsaver" offers less than 1/5 the wearing surface of an ordinary solid face pulley. Note the exclusive wing and cone design of "Beltsaver" provides runways which allow material to escape—thus preventing



its being pressed into the unprotected under side of the belt—causing abrasion and serrations.

"BELTSAVERS" are made in standard sizes and are interchangeable with regular face pulleys. Send for data sheet with complete diameters, sizes, faces, and prices.

SPROUT, WALDRON & CO.

140 Sherman St. Muncy, Pa.

Designers, Engineers, Manufacturers
Since 1866

Oil Situation Becoming More Critical; Conversion and Use of Coal Pushed

(*Continued from page 45*)

Although there was great activity in possible measures to increase the flow of fuel oil to the Atlantic and New England states last month, the prospects of meeting even the minimum ration figures were considered poor. "Minimum rationed daily demand requirements" are expected to rise to 1,600,000 bbl. in the first quarter of 1943, Secretary Ickes announced, while measures now under way should provide an overland movement of 1,229,000 bbl. by the end of the year against a "minimum rationed daily demand of 1,367,000." The difference would have to depend upon ocean movement, "which no longer is either safe or certain."

Part of the blame for failure to meet oil requirements was laid on oil price ceilings and differentials by F. H. LaGuardia, chairman of the Committee of Atlantic States Mayors on Fuel and Oil. OPA late in June granted a special increase in the price of gasoline and light fuel oils along the eastern seaboard "to finance the increased cost of transporting petroleum products into the restricted area and assure unrestricted movement." The increases were granted, it was stated, because of inability to work out arrangements whereby the government would absorb the higher cost of moving petroleum products diverted from water to overland.

More Oil Proposed

In addition to the Texas-Illinois pipeline for which pipe production already is under way, other projects for increasing the flow to the East included a $30,000,000 pipeline relocation program, proposals for a barge canal across Florida (which, however, could not be built for some years) and the possibility of diverting Great Lakes tanker tonnage to increase the flow of oil through the New York State Barge Canal. The pipeline relocation projects, mostly to be financed by oil companies, with the Defense Plants Corporation taking care of a Florida line, are designed to increase the overland movement some 200,000 bbl. daily (87,000 exclusively by pipe and the rest transshipped) by the end of the year. The WPB was reported to have approved the major part of these proposals, and Congress voted the Florida projects and another pipeline relocation on July 18. Meanwhile, production of the pipe for the Texas-Salem (Ill.) line (June *Coal Age*, p. 37) has been started. Another large pipeline from Illinois to Bayonne, N. J., was being talked of at the end of the month.

In the field of conversion, available information indicates some progress in the industrial and domestic fields, although in the latter the public response has been rather apathetic. The record has been more favorable in the industrial field in the East, where a considerable number of plants have found it possible to change over without obtaining large quantities of materials.

A survey of 733 fuel dealers in the North Atlantic states by Anthracite Industries, Inc., shows that householders are doing little about converting in spite of repeated warnings. The average dealer, according to the report, has made only 2.9 conversions; average purchase of coal grates for later installation if necessary averages 2.3 per dealer; and the average dealer has had only nine inquiries or requests for conversion estimates.

Some 50 percent of present oil-burner installations could be converted to coal without complications, according to a survey in the anthracite burning territory by the Anthracite Industries Laboratory, Primos, Pa. Based on 1,000 inspections, this survey, the second of a series (Report No. 3123), shows that control problems would be involved in about 20 percent of the cases, while about 30 percent would be difficult or impracticable because of type of oil-burning equipment involved. Further details are given in the accompanying figure, taken from the report. The laboratory also points out that although 1,000 installations inspected is a small fraction of the total of approximately 1,250,000 oil burner jobs, comparison with other information indicates that the trends and rough proportions "could be substantiated to a point well within practical usages."

Anthracite Active

Much work has been done by the anthracite industry, beginning in the fall of 1941, when an oil shortage was forecast by Secretary Ickes. In addition to assistance to dealers and missionary work among municipal officials, civilian defense organizations, newspapers and magazines and other mediums for reaching the public, the anthracite industry has worked closely with manufacturers of equipment and has developed and is manufacturing special grate bars where regular bars for conversion are not available. Plenty of materials are available to do the work in case the public wants it, it is stated.

Anthracite, however, as well as other branches of the industry, has run up against a provision of Limitation Order No. 79 which forbids substitution of an entirely new heating unit using solid fuel for a serviceable oil installation. Replacement of an oil burner is approved, but not substitution of a new furnace or boiler for burning coal. Both the anthracite and bituminous industries, available information indicates, are of the opinion that real progress in conversion will not be achieved until the government takes more definite steps than merely issuing warnings and appeals. In line with this conclusion, A. V. Hutchinson, secretary, American Society of Heating and Ventilating Engineers, following a meeting of the society with all branches of the heating and allied industries July 21 in New York, stated that President Roosevelt would be requested to devote a "fireside chat" to clearing up "misunderstandings" on the fuel-oil situation and to emphasize the necessity for conservation and conversion to solid fuel.

To promote conversion work, utilization engineers of several anthracite companies, at a meeting at the Anthracite Industries Laboratory early in July, adopted the following standards as a guide in recommending

grate equipment in changing from oil to anthracite:

1. Substantially all of the projected grate area as found in the original boiler shall be utilized.
2. Equipment shall be capable of producing an output equivalent to a burning rate of 7 lb. per hour per original square foot of boiler area.
3. Equipment shall include a shaking or dumping grate capable of handling the ashes of anthracite without dependence upon clinkering properties or the necessity for removal of any part of the refuse or ash through the firing door.
4. Reasonably convenient coal- and ash-handling facilities shall be provided.
5. Conversion equipment investigated to date employing the use of the oil burner for forced draft does not offer a sufficiently reliable means of heat liberation with anthracite. [Editor's note: several conversion units of this type recently have been advertised in eastern newspapers.]

The engineers attending the meeting were of the opinion that the dealer could best handle the problems of mass conversions and rationed fuel-oil supply by the following procedures:

1. If fuel oil is being used in the boiler or furnace which previously burned coal, suggest to the user that a search be made to see if the original grates are on hand. If a further inspection shows that the grate lugs (which support the grates) are intact, recommend that these original grates be reinstalled and all doors or dampers needed to complete the conversion be purchased.
2. If the original grates are not in the cellar and the grate lugs are intact, recommend that standard grates be ordered from the boiler manufacturer or heating contractor for immediate installation.
3. If the grate lugs are not intact and the boiler manufacturer cannot supply standard grates, recommend the special grates and supports which can be furnished by the several anthracite producing companies.
4. If fuel oil is being burned in special oil-burning units which cannot be converted to coal, several methods of auxiliary heating to supplement the oil-heating deficiency can be recommended. These can be obtained by writing to Anthracite Industries, Inc., New York City.

With other matters affecting the coal supply, allocation was reported to have been the subject of a meeting of the Solid Fuels Advisory Committee early in July. An allocation plan, it is understood, has been perfected by the Office of the Solid Fuels Coordinator for War and is now in process of reference to other government departments and agencies pending possible promulgation.

Proposals for freight-movement zoning brought a protest from the Pocahontas Operators' Association late in July. In a letter to Governor Dwight Greene and other southern Illinois citizens, declared to be supporting the zoning movement, J. J. Lincoln, association president, and W. E. E. Koepler, secretary, called attention to this attempt to erect "tariff barriers between the states" and termed the proposal "not only impractical but unfair."

Other developments in the transportation picture included an order issued by Joseph B. Eastman, Defense Transportation Director, July 6, prohibiting coastwise colliers from transporting coal from Hampton Roads to any New England port west of Stonington, Conn., except as authorized by special or general permit. The order went into effect July 22 and is designed to concentrate all self-propelled coal ships of 1,000 tons or more on the longer hauls to New England which cannot be served efficiently by barge lines. "The effect of the order is expected to be a greater utilization of barges for the shorter-haul movement along the inland waterway to New York and nearby Connecticut."

The return-load provision in the long-haul

Four flat bearing surfaces give the Laughlin Safety Clip a four-square *Fist-Grip* on wire rope. No finger-pinching U-Bolt to bite and bend the strands, weakening them under high tension and whipping.

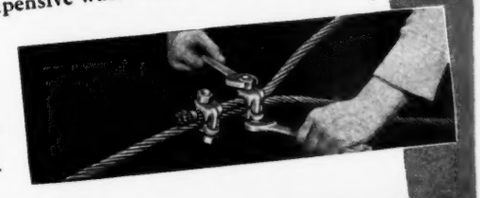
95% of Rope Strength delivered with the Fist-Grip Safety Clip is proved by competitive tests, three Safety Clips holding when the rope snaps under four U-Bolt Clips. Fewer clips mean savings in time and money. And inexperienced help can't put them on backwards — the saddles are identical.

25% STEEL SAVED FOR WAR NEEDS—

For an assembly of equal strength, Safety Clips use 25% less steel than a U-Bolt assembly. You are saving precious steel available for ships, tanks and guns when you use Safety Clips. Remember — they don't crimp and crush wire rope — no expensive waste from cut-off rope ends.

These Safety Savings Can Be Yours

No rope crimping — rope saved
Can't go on backward — accidents saved
Bolts on opposite sides — tightening time saved
No battered, bent threads — clips saved
No special wrench — tools saved
Fewer clips needed — clips saved
Fewer rope breaks — accidents saved



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Look for Laughlin Products in *Coal Mining Catalogs*

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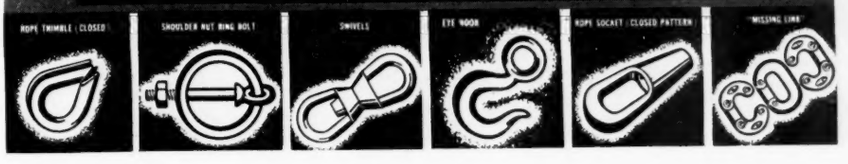

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FOR LONGER TIE LIFE AT LOWER COST

Osmose-treated Oak ties installed by a prominent mining company on outside track.*

Osmose-treated ties cut replacement costs and help prevent accidents

Because untreated ties previously decayed within a few years, thereby necessitating frequent costly replacements, a prominent Southern mining company* investigated and installed Osmose-treated ties. Careful records proved that the Osmose-treated ties lasted 3 to 5 times longer than the untreated ties thus cutting replacements and costs by as much as 300 to 500%. Rail spreading with resultant accidents was also minimized because of sounder wood structure around the rail spikes. Today, this company, as well as many other mining companies, uses Osmose-treated ties and timbers exclusively. Our field engineers will gladly assist you in solving your wood-preserving problems. Write for Bulletin 142-C, today.

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1. APPLICABLE to fresh cut native timber locally obtained and treated thus eliminating or reducing transportation costs to minimum.

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3. ECONOMICAL. No capital investment in treating equipment required. Eliminates costly transportation to and from mechanical pressure-treating plants.

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General Offices: Buffalo, N. Y.—Branch Offices: Birmingham, Ala.; Denver, Colo.; Harlan, Ky.; Kenova, W. Va.

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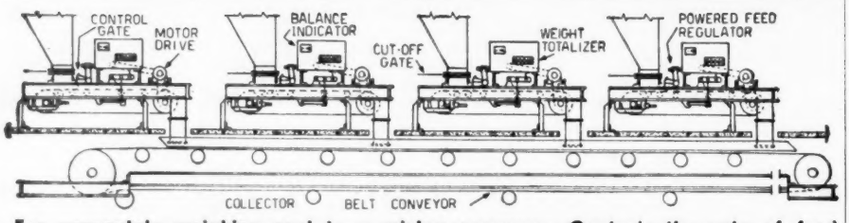

For accurately weighing coal to a mixing conveyor—Controls the rate of feed and continuously totalizes the weight delivered

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Coming Meetings

- Joint meeting of Coal Division, A.I.M.E., and Fuels Division, A.S.M.E., Sept. 30-Oct. 2, St. Louis, Mo.
- National Safety Congress and Exposition: Oct. 6-8, Stevens Hotel, Chicago (postponed from Oct. 2-4).

truck rules of the Office of Defense Transportation was cancelled in a revision of orders announced July 14. Under the revisions, effective Aug. 1, all trucks affected must carry a capacity load over a "considerable portion" of the trip out or the trip back. They may carry less than a capacity load or travel empty if the driver, after exercising "due diligence," is unable to comply with the old requirement that the return load must be at least 75 percent of capacity. The revised rules also included a speed limit of 40 m.p.h. to increase tire and truck life. Other provisions of the original order, including load limits, were left largely unchanged.

•

Mines Bureau Forms Division of Mineral Production Security

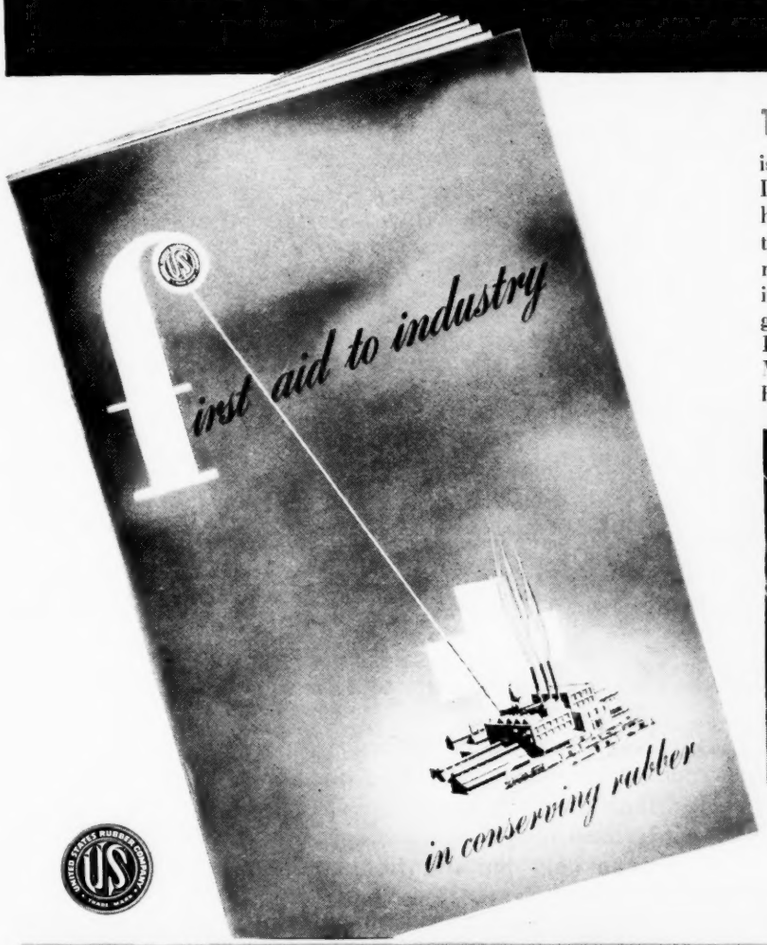
Director R. R. Sayers of the U. S. Bureau of Mines has appointed J. J. Forbes as Chief of the Bureau's new Mineral Production Security Division. Mr. Forbes is well known in the coal industry through his 30 years' experience as a mining engineer and an exponent of safety, being recently named chief of the Coal Mine Inspection Division. William J. Fene will be Chief of the Coal Mining Section of the new division, and S. H. Ash will be Chief of the Metal and Nonmetallic Mineral Mining Section.

This Mineral Production Security Division is under the general supervision of Dan Harrington, Chief of the Health and Safety Service of the Bureau, and its work will not only be integrated with other units of this service, such as explosives control and federal coal mine inspection, but with activities of other agencies, including the Office of Civilian Defense, Federal Bureau of Investigation, etc.

Although the new division is authorized to concern itself with any factors which could affect the continued production of vital war materials, such as personal safety, labor trouble or decreased efficiency in production, it will deal primarily with the safety of the producing plants themselves, stressing the responsibility of owner management in protection against industrial interruptions; against accidents, such as fires and explosions; and in taking precautions against subversive enemy action.

The Coal Mining Section will assume responsibility for making investigations in and around coal mines and launching security measures when the continued operation of a coal mine seems to indicate that such measures are necessary. The Director of the Bureau stresses that the closing down of important mines or plants at this time might cause serious curtailment of the output of implements of war; hence subversive action and hazardous accidents must be continuously guarded against.

HOW TO HELP YOUR PLANT IN THIS RUBBER CRISIS



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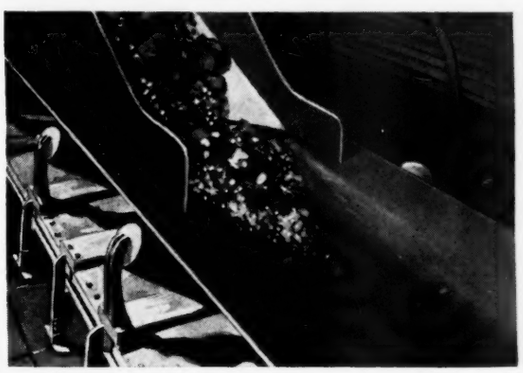
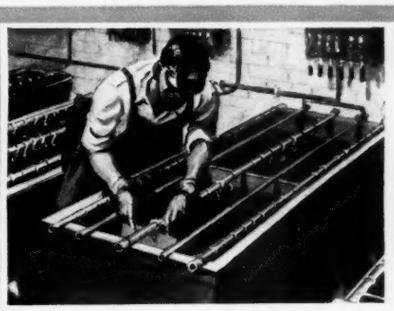
is for managers, engineers and plant operating men. It shows how to conserve rubber through proper handling, installation and care by methods such as those illustrated below. Other subjects covered are molded goods, rubber covered rolls, rubber mountings, rubber printing materials, mats and matting, grinding wheels, electrical wires, cables and tapes. Free copies will be sent on request. Write the Mechanical Goods Division, Dept. 5, United States Rubber Company, at address below.



Protect Conveyor Belts by using "V"-shape notch in loading chute to distribute fine material first as cushion for heavy lumps.

Conserve Hose by proper choice and installation of couplings to assure application without injury to hose tube.

Extend Packing Life by examination of equipment, and reconditioning worn moving parts before repacking.



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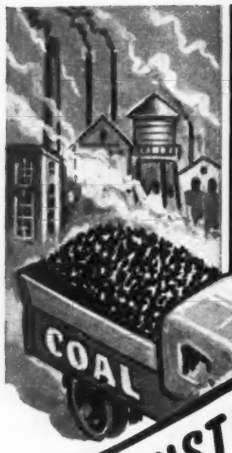

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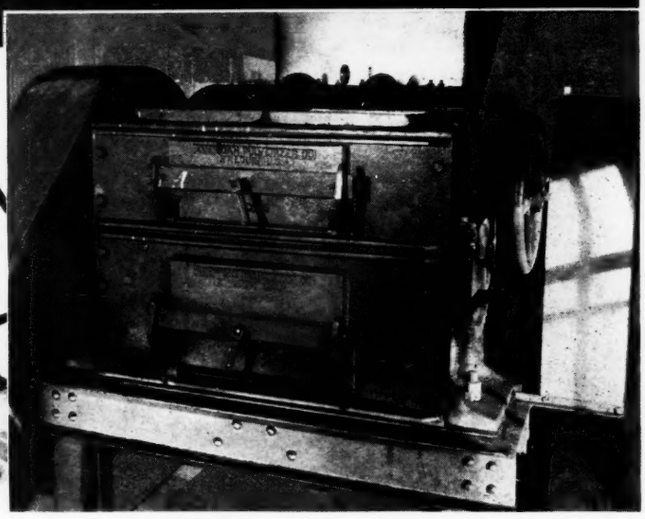

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Absenteeism, Other War-Production Problems Debated by Appalachian Section, A.I.M.E.

Virginia Anthracite Mining and Preparation—Absenteeism and Labor Shortages in Coal Mining—Maintenance of Coal Quality and Prevention of Losses—Railroad and Power Contributions, Etc.—As Discussed at the June 27–28 Meet.

ABSENTEEISM in the central southern fields, reported to be rapidly increasing; Virginia semi-anthracite and technical and operating problems in mining were the subjects of a two-day war effort meeting staged by the Central Appalachian Section of the American Institute of Mining and Metallurgical Engineers at Virginia Polytechnic Institute, Blacksburg, June 26, and at the Mountain Lake Hotel, 18 miles distant, on June 27. Part of the first day's activities was a trip to view the Virginia anthracite bed and a formation carrying manganese ore along the Blacksburg-Mountain Lake road, with explanatory comments by R. J. Holden, department of mining geology, V.P.I.

R. H. Morris, general manager, Gauley Mountain Coal Co., Ansted, W. Va., and chairman of the Central Appalachian Section, guided the meeting and presided at the Friday luncheon. James M. Godwin, chief inspector, Pocahontas Land Corporation, Bluefield, W. Va., and J. A. Hagy, superintendent of mines, Jewell Ridge Coal Corporation, Jewell Ridge, Va., were chairmen of the two parts of the technical session Friday afternoon. Wm. A. Staab, associate professor of mining engineering, West Virginia University, and chairman for the Saturday morning session, enlisted the aid of E. R. Price, general superintendent, Inland Steel Co., Wheelwright, Ky., in conducting a five-speaker symposium on coal and national defense. At the banquet, with Charles E. Lawall, president, West Virginia University, as toastmaster, the theme was "Our War Effort." L. I. Cothern, professor of mining engineering, V.P.I., and vice-chairman of the section, supervised local arrangements for the meeting.

Va. Semi-Anthracite Mining

Virginia produced approximately 210,000 tons of semi-anthracite last year, according to R. G. Stevens, president and manager, Great Valley Anthracite Coal Corporation, Radford, Va. His company operates one of the two railroad shipping mines, both with mechanical cleaning. In addition the district has a number of truck mines most of which prepare this semi-anthracite by hand picking. Most of the coal is used locally but occasionally cars are shipped as far as Florida and Canada. Generally speaking, the coal is acceptable in its markets if the ash is kept below 22 percent. Bagging business, principally $\frac{7}{8}$ x $2\frac{1}{2}$-in. nut, is the outstanding market and some of the coal goes to government camps.

Based on student tests on coal from the Great Valley mine, Charles E. Sears, instructor, mining engineering, V.P.I., presented a "Washability Study of Virginia Semi-Anthracite." With as many as thirty banded layers in the seam, the problem is to get rid of a very large quantity of rock. As a testing preliminary, the coal samples, some taken in the mine and others at the crusher on the surface, were crushed to 3-in. Based on the plus and minus 10 percent specific gravity distribution, the washability curves showed that the 3 x $1\frac{1}{2}$-in. could be washed at 1.66 gravity with a 55-percent recovery, the $1\frac{1}{2}$ x $\frac{3}{4}$-in. at 1.67 with a yield of 63 and the $\frac{3}{16}$-in. x 14-mesh at 1.6 gravity with 75-percent yield.

The $\frac{3}{4}$ x $\frac{3}{8}$-in. (total ash, 30 percent) did not act as expected in that the ash was higher in the 1.26-gravity material than in the 1.35-gravity. Yield on this size was $75\frac{1}{2}$ percent. The same "misbehavior" was noted for the $\frac{3}{8}$ x $\frac{3}{16}$-in., in which the recovery was 86 percent. Answering questions, Mr. Sears said the finer sizes run the lowest in ash. Minus-14-mesh material carries but 20 percent. Ash-fusion temperatures range from 2,400 to 2,600 deg. F.; the B.t.u. value is 12,200 to 12,240, and jigs are used principally in preparation, but one plant has a Rheolaveur washing down to $\frac{1}{8}$-in.

Only Mississippian Output

Dr. Holden pointed out that this Virginia semi-anthracite, "in which mining will be going on 150 years from now," lies about a mile below the Pennsylvanian coals in the columnar section, and is the only producer of consequence in the world from the Mississippian measures. Professor Cothern said that "in preparation for the coal-burning Utopia where all will be used either as stoker or pulverized size" he hopes to make an investigation of the reduction of ash in the stoker size by jig cleaning or other means and in the fines by flotation.

Preliminary to an inspection trip through the recently equipped laboratories in the new V.P.I. Mineral Industries Building, S. F. Coats, president of the local student A.I.M.E. chapter, used slides to describe the equipment. Outstanding items are a variable-speed fan and wind tunnel, two coal tables and a complete pilot plant including grinding, flotation, thickener and drum-filter equipment for treatment of ores such as manganese.

"Concentrating Problems of Virginia and West Virginia Manganese Ores" was discussed by J. T. McCormack, mineral research technician, V.P.I.

In contrast to the other sections reporting on coal mining, eastern Kentucky, according to Mr. Price, has not experienced a shortage of labor. The problem is absenteeism, which is much greater than a year ago, when we were not at war. At Wheelwright mine, about 5.75 percent of the employees have gone into military service. Inclusion of a "work regularly so far as health will permit" clause on cards pledging bond buying has helped. Mr. Price emphasized that accomplishment of our war effort

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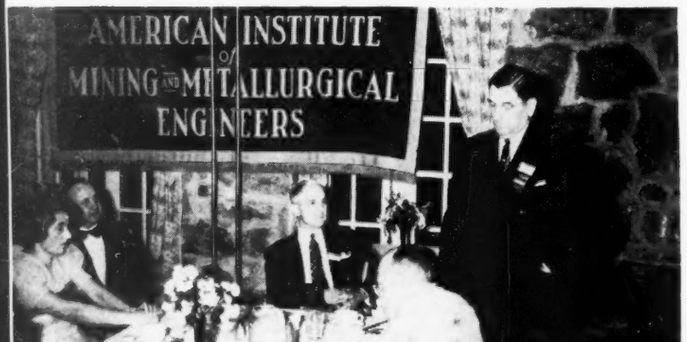
STEARNS-MAGNETIC MILWAUKEE

E. R. Price, Inland Steel Co., Wheelwright, Ky. (left), and Alex U. Miller, U. S. Bureau of Mines, Mt. Hope, W. Va., looking at the multi-banded semi-anthracite bed in the Mississippian measures near Blacksburg, Va.

At the opening session: left to right, L. I. Cothern, R. H. Morris, J. A. Hagy and James M. Godwin.



R. H. Morris, chairman of the section, doing a little toastmastering.

Enjoying the 4,000-ft. altitude: Veleair C. Smith, J. H. Herb, Chester A. Naramore, R. H. Morris and L. I. Cothern.

Virginia's state geologist, Dr. Arthur Bevan, making a point.

One of the groups inspecting the new mining engineering laboratories at V.P.I. Left to right: H. P. Musser, president, West Virginia Engineering Co., Charleston, W. Va.; Julius Hall Jr., Appalachian Electric Power Co., Bluefield, W. Va.; James M. Godwin, chief mine inspector, Pocahontas Land Corporation, Bluefield, W. Va.; R. G. Stevens, president and manager, Great Valley Anthracite Coal Corporation, Radford, Va.; R. H. Morris, general manager, Gauley Mountain Coal Co., Ansted, W. Va.; and J. H. Herb, Pennsylvania Crusher Co., Pittsburgh, Pa.

Dr. Huston St. Clair reporting on Virginia coal mining. E. R. Price (center) conducted the symposium. Chairman Wm. A. Staab is at right.

Adjournment of the last technical session is followed by lunch at the Mountain Lake Hotel.

West Virginia's state geologist, Dr. Paul H. Price, on the floor.

E. Lawall, president, West Virginia University, leading off at the banquet.

depends on labor and that neither the labor nor the employing group "should ask for any special privileges at this critical period." Compared to the opening of numerous new mines during World War I, eastern Kentucky now has but one new mine under development, although several old properties are being reopened. Kentucky University is about to start research into low-temperature distillation of the highly volatile coals of the eastern part of the State.

Absenteeism, now running 17 percent, is the problem of great concern in the Virginia coal fields, said Dr. Huston St. Clair, president, Jewell Ridge Coal Corporation. Tazewell County is suffering a shortage of available men, but to the west no shortage has been reported. He said that although Virginia has every type of coal widely used in the United States, little of it is shipped through tidewater and there has been very little shift of tonnage outside of the regular channels. Mining methods range all the way from hand loading in Tazewell County to mobile loading into mine cars, in which Buchanan County is practically 100 percent.

Inadequacy in labor supply has caused production in the Pocahontas field to drop 5½ percent below a comparable period last year, according to figures presented by R. C. Luther, vice-president, Peerless Coal & Coke Co., Vivian, W. Va. In a 12-week period before the meeting output was 680,000 tons, against 720,000 tons the year before. A survey indicated that almost 10 percent of the Pocahontas field employees have gone into military service and that 79 percent of the remainder are in the military ages between 20 and 45. Lack of thorough understanding with the local draft boards has been a cause of losing some men that otherwise might have been deferred.

Layoffs in the district are increasing very rapidly. These, according to Mr. Luther, are due to increased pay per day, dislike of night shifts and a loss of the most sturdy men. Labor turnover also is increasing at an alarming rate. As to supplies, the difficulties have been small and, although priority regulations and methods are constantly improving, he hoped that an allocation program would provide a better solution. Transportation has been satisfactory and power supply adequate. Due to stocking programs, domestic business is brisk but there is concern for this business next fall and early winter if the weather is mild. The industrial picture is extremely favorable because few of those users have stocking facilities and for the most part industry is using each ton it buys.

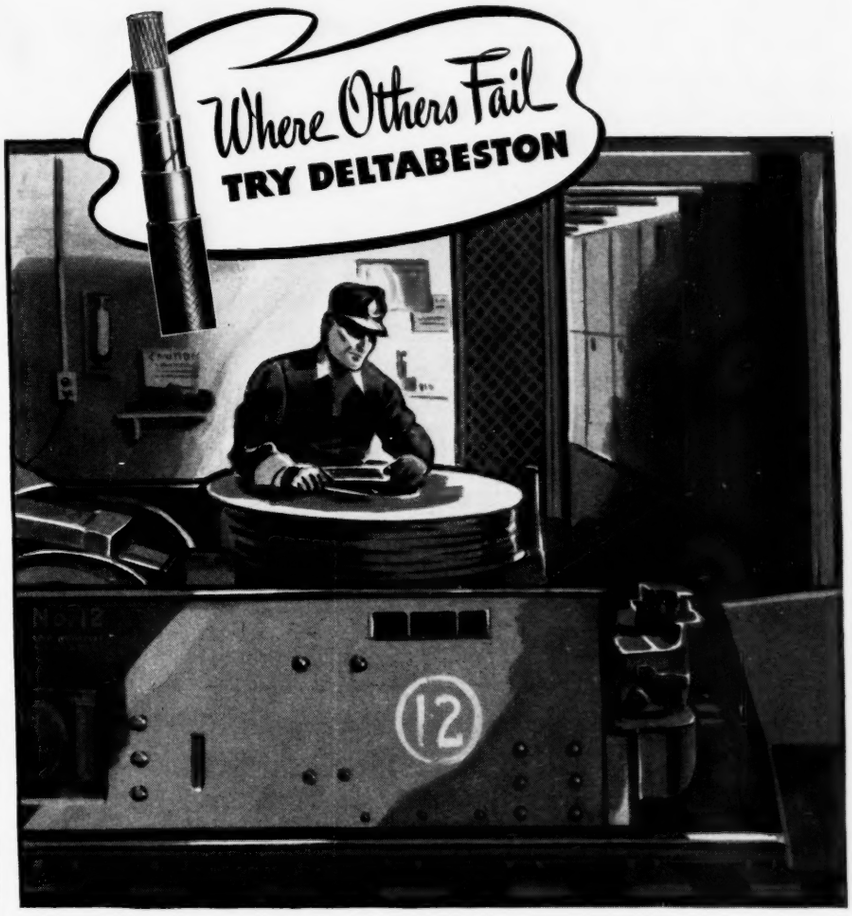
At the Peerless mine, layoffs, which had

Bureau of Mines Approvals

Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in June, as follows:

Joy Mfg. Co.—Type 42D7P shuttle car (storage-battery operated); two 7½ and two 5-hp. motors, 90 volts, d.c.; Approval 450; June 3.

Joy Mfg. Co.—Type T4-2P caterpillar tractor (machinery-moving unit); two 4-hp. motors, 250 and 500 volts, d.c.; approvals 451 and 451A; June 23.



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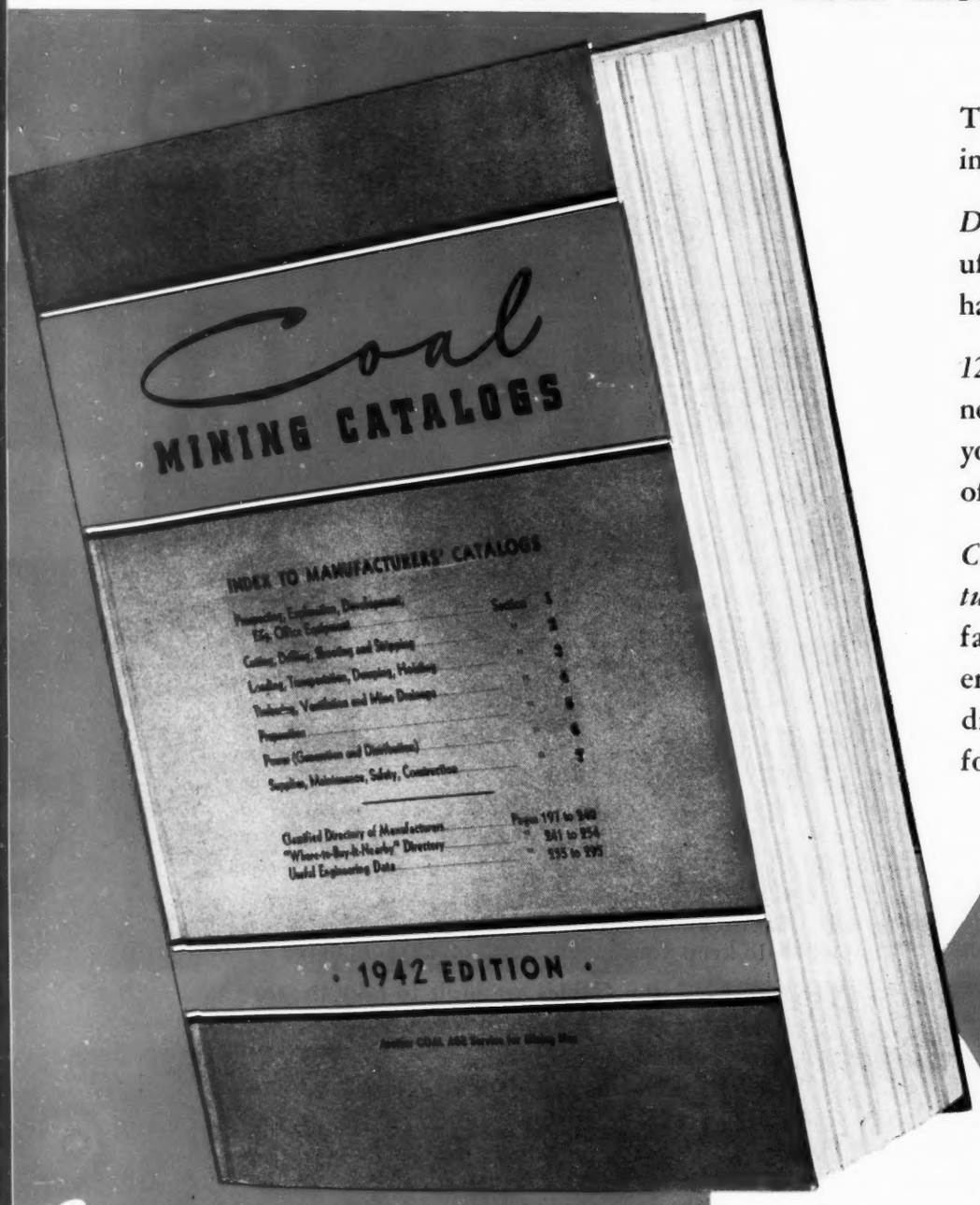

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mounted to 15 percent, have been reduced recently to between 9 and 10 percent by a local campaign. One help has been to award a $25 war bond each half to the loader producing the highest tonnage. A list also is posted showing on one side the men who are in the armed forces and on the other mine workers who have laid off. The intimation is that those who have laid off unnecessarily are helping the Axis.

Unless supplies for the proper maintenance and rebuilding of equipment are shut off, the railroads will continue to supply adequate service, declared F. K. Prosser, coal traffic manager, Norfolk & Western Ry. There is much diversion of traffic to new routes and the government is more and more utilizing low-sided gondolas. The N. & W. alone has expended $60,000,000 for improvements since 1929.

It is ridiculous to lose coal to the waste pile on the outside after mining it under the present increasing difficulties, said T. W. Guy, consulting engineer, Charleston. His paper on preparation as related to the national defense advocated; (1) maintaining quality and dependability and avoiding experimenting, (2) consumers sticking to their dependable supply and (3) eliminating waste of coal by cutting losses underground and on the surface to the practicable minimum. G. E. Keller, Commercial Testing & Engineering Co., Charleston, observed that to date he has found no let-down in quality in any field. Necessity for low ash in coking coals is indicated by the fact that a 1-percent increase means a 1½-percent increase in the ash in the coke.

Steam Capacity Rises

Some 400 tons of coal at a cost of approximately $1,100 is required to furnish the power to produce the aluminum for one army bomber, said Luke Bates, power engineer, Appalachian Power Co., Bluefield. Speaking specifically for that power company and in a general way for the Kentucky & West Virginia Power Co., he told of the recent tremendous increases in steam-plant capacity and of the ones under way. The coal mines have been supplied with adequate power even though huge blocks have been diverted to TVA during the shortage caused by low water and increased demand.

Carel Robinson, consulting engineer, Charleston, said that the real opportunity for offsetting the mine labor shortage lies in educating the public to demand a return to the 6-day week. Only about 70 percent of the biblical labor period is being realized because the 5-day contract cut off 16⅔ percent, and the layoffs, mostly on Monday and Fridays, now amount to as much as 17 percent.

The technical session on Saturday morning included papers on dolomite as a source of magnesium. Dr. Paul H. Price, geologist for West Virginia, dealt with the subject for that State and Dr. Arthur Bevan, geologist for Virginia, for his State.

Even at the banquet the war effort was the principal theme. Dean Earle B. Norris, School of Engineering, V.P.I., said that the students have been put on an accelerated 12-month basis to train in three years as officers for the armed forces and as graduates for civilian engineering jobs. In an air-conditioned section of the mechanical laboratory

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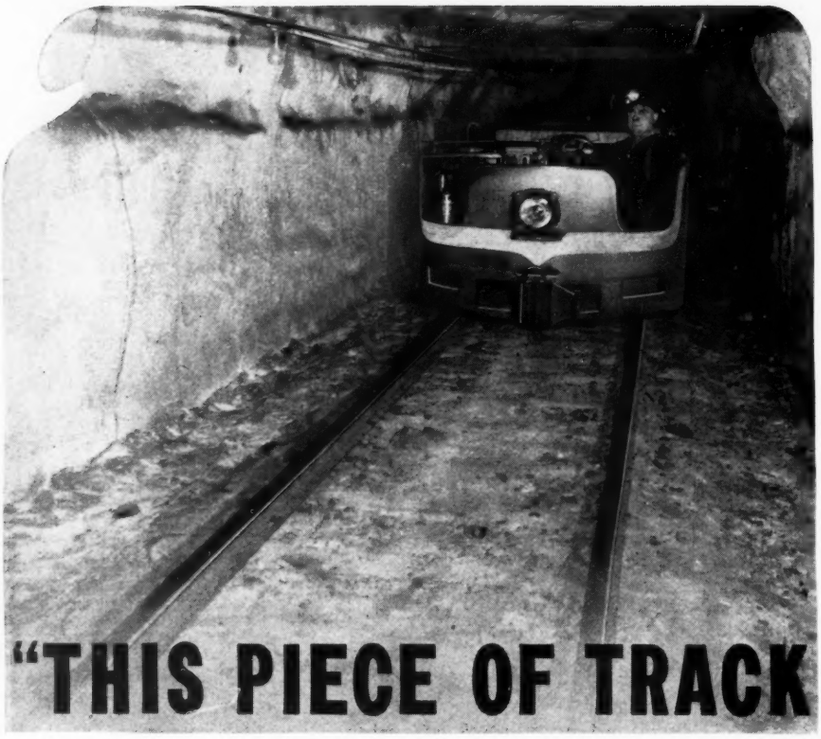

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plywoods built up with resinous glues are being investigated for aircraft and pipe manufacture. Necessity for the conservation of rails and other materials in and about the mines was stressed by D. L. McElroy, WPB Mining Branch, but he assured operators that they will get what they really need. Rails can no longer be left many months in idle tracks awaiting final recovery of remaining coal in the section. Instead of buying additional rail the time has come when the idle rails must be taken up and, if necessary, put back later.

Veleair C. Smith, consulting engineer, Charleston, called attention to the enemy's increases in strategic materials and in power in the form of coal and oil. One of our weaknesses is not paying proper attention to the small operators who do not have the personnel to contact Washington for priorities.

Bringing a message from the Virginia Coal Operators' Association, Milo S. Summers, chief engineer, Stonega Coke & Coal Co., said the recent order permitting deferment of certain key men is an important step in meeting the chief problem, personnel. Of the 245 men (6 percent) which his company had lost by draft and enlistment up to June 1, many were key men. He paid tribute to the WPB Mining Branch and said his company is trying to reuse all materials until they are completely worn out. From the Pocahontas field, H. W. Saunders, chief engineer, American Coal Co. of Allegany County, also told of working materials over and over. Because of loss of personnel the better areas of coal are having to be mined sooner than they normally would.

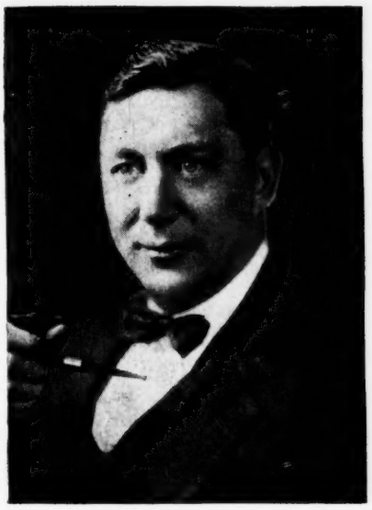
Stanley Higgins, secretary, New River Coal Operators' Association, Mt. Hope, W. Va., said that coal, which is an essential and therefore a critical material, must be produced in 1942 at an average rate of 11,000,000 tons per week. Right now the margin of capacity over that production is only 10 percent. He decried absenteeism of 14 percent and the 35-hour week when many of the men in the armed services are hard at work from 5:30 in the morning to 10 at night.

General benefits in the scrap collection movements which tend to make people more conscious of the little things were seen by Mr. Higgins. Reduction of transportation from tidewater to New England and diversion of railroad facilities to war transportation are threats to the maintenance of production in the coal industry. As bright lights he mentioned that the railroads are now doing a better job with 34 percent less fuel than during World War I and power companies are turning out a kilowatt-hour of energy for 60 percent less than the country's average during those days.

•

Leyden Lignite Promotes

Harry F. Nash, vice-president and general manager, Leyden Lignite Co., Denver, Colo., has been promoted to president and general manager. Other officers are: vice-president, Donald B. Robertson; secretary-treasurer, W. A. Alexander; mine superintendent, C. E. Dollar; mine foreman, John Page; chief electrician, John Detlefsen; in charge of mechanical loading, Elwin Hedden.



R. L. Ireland, Jr.

Ohio Coal Association Reelects Ireland as President

R. L. Ireland, Jr., president of the Hanna Coal Co., was reelected president of the Ohio Coal Association at its annual meeting held June 30 at Cleveland. Other officers are: vice-president, E. H. Davis, executive vice-president, New York Coal Co.; executive vice-president, Ezra Van Horn; secretary and treasurer, E. H. Miller; assistant secretary and treasurer, F. H. Bohecker. Those in attendance included John D. Battle, executive secretary, National Coal Association; representatives of all the leading companies in the State, the State Bureau of Mines, Industrial Commission, Workmen's Compensation Board, etc.

•

New Preparation Facilities

Crucible Fuel Co., Crucible, Pa.—Contract closed for two C.M.I. continuous centrifugal dryers (contracting engineers, Roberts & Schaefer) to handle 110 t.p.h. of ¼-in.x48-mesh bituminous coal; probably will be completed in November.

Harry E. Coal Co., Swoyerville, Pa.—Contract closed with Finch Mfg. Co. for one 4-ft. Menzies cone to clean No. 5 buckwheat (⅜-in.x30-m.); feed capacity, 22 t.p.h.

Hudson Coal Co., Loree Breaker, Plymouth, Pa.—Contract closed with Wilmot Engineering Co. for one 6-ft. Wilmot Hydrotator to clean rice coal; capacity, 50 t.p.h. of clean coal; also one 7-ft. Wilmot Hydrotator to clean barley coal; capacity, 75 t.p.h. of clean coal; also one 8-ft. Wilmot Hydrotator to clean Anthrafine; capacity, 45 t.p.h. of clean coal.

Old Ben Coal Corporation, Franklin County, Illinois—Contract closed with McNally-Pittsburg Mfg. Corporation for installation of McNally-Norton automatic washer and Norton-Collins dedusting equipment to handle 400 t.p.h. of 0x½-in. coal; also unloading station to receive coal from other mines; to be completed about June 1, 1943.

Republic Steel Corporation, Clyde Mines, Fredericktown, Pa.—Contract closed for three C.M.I. continuous centrifugal dryers (contracting engineers, Roberts & Schae-

DO IT NOW!

Don't risk disastrous dust explosions and consequent loss of life and production . . . prepare NOW for adequate ROCK DUSTER capacity to safeguard planned future operations . . . and let AMERICAN supply you with the size and type DUSTRIBUTOR you need. Remember—priorities will delay deliveries later. With ROCK DUSTING recognized as the simplest routine safety measure in good mining practice. . . .

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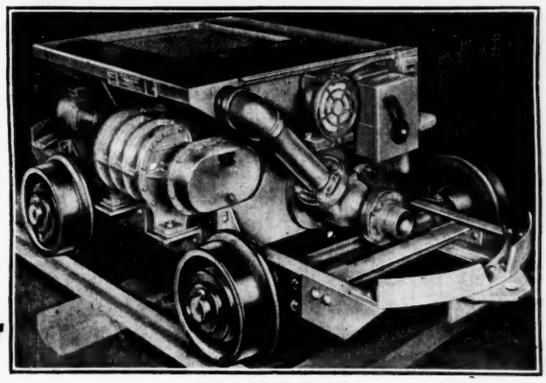
Order TODAY to Meet Tomorrow's Expanded Needs!



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The machine to be used on entries or areas that can be reached with 100 ft. of hose. Compactly and rigidly built for hard service. Overall height above rail—27 in. Hopper capacity—400 lbs. Weight —1800 lbs. Easily handled on cage—A REAL BUY.

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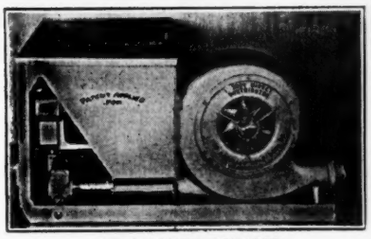

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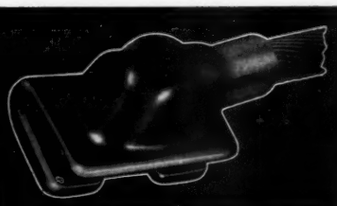
MESCO *Flashwelded* RAIL BONDS

For Greater Power...More Profits

Production lags today not only slow up the vital war effort, but also cost money. Prevent power losses by installing Mosebach Flashwelded Rail Bonds for protection against power and profit leaks in your haulage system. . . . The patented Flashweld process gives stronger, more oxygen-free welds at the terminals, resulting in lower resistance and long bond life. This gives greater power and more profit by increased efficiency.



Flashweld Bonds are made in 18 different styles—one for every bond requirement. Write for complete details.

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HAVING TROUBLE GETTING CABLE?

The "Flood City" Cable Vulcanizer IS THE ANSWER

DON'T let worn cables hold up your production. The "F-C" Cable Vulcanizer provides a vulcanized Splice in all rubber cable that eliminates usual troubles encountered with a tapered joint. Produces section equivalent to original insulation. Instruction sheet provided giving full details for making perfect joints. Molds can be furnished to take practically any size and type of cable.

Vulcanizer is compact; wgt. 63 lbs. 15" long, 9" high, 6" wide. Connect to any source of power provided heating units of proper voltage are specified. Set screws on top provide pressure necessary for dense, hard rubber joint.

FLOOD CITY BRASS & ELECTRIC CO.

JOHNSTOWN, PENNSYLVANIA

COTTON IS KNIFING deeply into burlap's wide domain while war keeps the big Indian monopoly textile at home.

U. S. coal mines use about 20 million yards of heavy cloth yearly to control air currents—disperse gases, prevent explosions. Heretofore burlap got the job almost exclusively.

Now cotton is taking over. A special, chemically treated, flameproof and mildewproof cotton fabric fills the bill. More than fills it, experimenters say. They claim it lasts three to five times as long as the burlap.

From the Wall Street Journal, Tues. June 23, 1942

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Moropa

COTTON BRATTICE CLOTH...

SO ORDER NOW FOR FUTURE NEEDS!

●TRY THE FAMOUS "BLOWTORCH" TEST and prove to your own satisfaction MOROPA'S resistance to fire

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fer Co.) to handle 165 t.p.h. of ½-in.x48-mesh bituminous coal; to be completed about October, 1942.

SUPREME ANTHRACITE COAL MINING Co., Ontario Breaker, Peckville, Pa.—Contract closed with Finch Mfg. Co. for one 4-ft. Menzies cone to clean barley coal; feed capacity, 22 t.p.h.

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Personal Notes

ROBERT ATCHINSON, hitherto mine foreman at Montour No. 9 mine of the Pittsburgh Coal Co., McDonald, Pa., has been transferred to Montour No. 4, Lawrence, Pa., in the same capacity.

LLOYD ANDERSON, who was at Peabody Mine No. 43, Harrisburg, Ill., until it was abandoned, and later at Mine No. 47, Harco, has been transferred to Mine No. 24, Danville, Ill., as superintendent.

W. J. BAILEY has been appointed superintendent of the Sayre mine, Republic Steel Corporation, Sayre, Ala. He had been connected with the Sayreton mine operations as mine foreman for several years.

CHARLES BARKER, who was superintendent a number of years ago at Peabody Mine No. 47, Harco, Ill., has been reappointed superintendent there.

JOHN BARTRAM, formerly assistant production manager for the Pittsburgh Coal Co., Pittsburgh, Pa., is now in the industrial relations department, where he has taken on the task of coordinating the training of personnel.

HARRY BRADBURY has resigned as a federal coal mine inspector to become general superintendent for the Moffat Coal Co., Sparta, Ill.

O. B. CLARK has been appointed manager of mines of the West Virginia Coal & Coke Corporation, Omar, W. Va.

JOHN W. DAVIS has been made assistant superintendent at Sayreton No. 1 mine, Republic Steel Corporation, Sayreton, Ala. He was formerly a mine foreman in this operation.

EUGENE D. GARDNER, supervising engineer of the Southwest Experiment Station of the U. S. Bureau of Mines, Tucson, Ariz., since 1925, has been appointed regional engineer in charge of the Bureau's newly organized Central States office, Rolla, Mo.

LEE HAZEN has resigned as chemist for the Bell & Zoller Coal & Mining Co., Zeigler, Ill., to accept a similar position with the Pyramid Coal Corporation, Pinckneyville, Ill.

W. J. HILLABRANT, superintendent of the Lion Coal Corporation's Utah Chief mine, Wattis, Utah, has been appointed superintendent at the same company's Star mine, Rock Springs, Wyo., vice R. Y. GIBSON, resigned.

J. J. HUDDLESTON, general superintendent and purchasing agent, Algoma Coal & Coke Co., Algoma, W. Va., has been named assistant secretary and a member of the board of directors, but will continue his former active

duties. He went from the Kanawha to the Pocahontas field when the Algoma company was organized by the Beury interests.

R. F. KIRKWOOD has been appointed superintendent of the Summit mine of the Alta Coal Co., Sumiton, Ala. He had previously been connected with the company as a mining executive but more recently had been with the Coal Valley operations of the DeBardeleben Coal Corporation.

FRANK C. LATHROP, of San Francisco, Calif., retired veteran west coast railroad official, has accepted appointment as a member of the Solid Fuels Advisory War Council, it was announced July 16 by Harold L. Ickes, Coordinator of Solid Fuels for War. Mr. Lathrop will be one of the two representatives of the general public on the war council and fills the vacancy created by the resignation of Louis J. Brann, former Governor of Maine.

ROBERT L. LINDSAY has been named superintendent by the Dering Coal Co., Eldorado, Ill. He was formerly mining engineer for the same company.

ROBERT D. MACDONALD has been named a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, where he has been assigned to the materials beneficiation division. He is a graduate of the Montana School of Mines and the Massachusetts Institute of Technology. Prior to joining the Battelle staff he was associated with the General Engineering Co., Salt Lake City, Utah.

PAUL R. MAXEY, heretofore general foreman for the American Rolling Mills Co., has been appointed chief engineer at the company's Nellis mine, Nellis, W. Va.

LEROY MOWREY, formerly in the inspection department of the Pittsburgh Coal Co., Pittsburgh, Pa., has taken the position of mine foreman at Montour No. 9, McDonald, Pa.

H. P. NICHOLS has been appointed division superintendent for the New River Co., operating in Fayette and Raleigh counties, West Virginia.

FRANK PERZ, who had been mine foreman for the last five years at Montour No. 4 mine of the Pittsburgh Coal Co., Lawrence, Pa., resigned June 30.

W. G. RUDD, vice-president of the People's Gas Light & Coke Co., Chicago, and also vice-president and director of the Chicago By-Products Association, is now a member of the Solid Fuels Advisory War Council. He succeeds D. M. Rugg, vice-president of the Koppers Co., Brooklyn, N. Y., who resigned in order to devote more of his time to the development of the synthetic rubber industry.

GEORGE S. STRUBLE, superintendent of the Nemacolin mine of the Buckeye Coal Co., has resigned that position to accept appointment as district State mine inspector at Brownsville, Pa.

JAMES WHITE, who was superintendent at Peabody Mine No. 24, Westville, Ill., has resigned and accepted a position as general superintendent for the Franklin County Coal Corporation, Herrin, Ill.

R. B. WATT has been appointed assistant superintendent of Sayreton No. 2 mine, Re-

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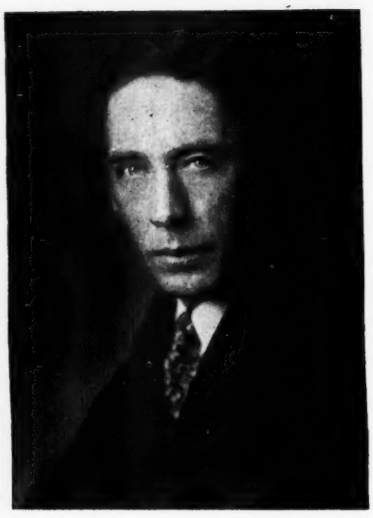

William P. Young

public Steel Corporation, Sayreton, Ala. He was formerly superintendent of the Edgewater mine, Tennessee Coal, Iron & Railroad Co., Pratt City, Ala.

EDGAR WEICHEL, of the Hudson Coal Co., Scranton, and GEORGE ROOS, general manager of the Philadelphia & Reading Coal & Iron Co., Pottsville, have been appointed by Governor James of Pennsylvania to the Anthracite Inspectors Examining Board.

WILLIAM P. YOUNG, vice-president and general manager, Bell & Zoller Coal & Mining Co., has been elected president, vice G. Donald Cowin, deceased. He has been with the company a number of years. DAVID H. MCMASTER has been advanced from executive vice-president to president of the sales organization; HOMER F. MCDONALD has been made vice-president; and E. L. CARR, assistant to the president.

•

To Operate Diamond Vale Mine

Merritt Coal Mines, Ltd., has been incorporated and will operate the Diamond Vale property, covering about 1,600 acres and lying partly within the city limits of Merritt, in the Nicola-Princeton district, British Columbia, Canada. The mine has been inoperative since 1917.

•

Coal-Mine Accident Fatality Rate Registers Upturn

Accidents at coal mines of the United States caused the deaths of 140 bituminous and 20 anthracite miners in May last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 48,250,000 net tons, the accident fatality rate among bituminous miners was 2.90 per million tons mined, compared with 2.38 in May, 1941.

The anthracite fatality rate from accidents in May last was 4.13, based on an output of 4,843,000 net tons, against 3.89 in the corresponding month of last year.

For the two industries combined, the accident fatality rate in May last was 3.01, compared with 2.50 in the fifth month of 1941.

Fatalities during May last, by causes and states, as well as comparable rates for the first five months of 1941 and 1942, are shown below:

UNITED STATES COAL-MINE FATALITIES IN MAY, 1942, BY CAUSES AND STATES

State	Underground											
	Falls of Roof	Falls of Face	Haulage	Gas or Dust Explosions	Explosives	Electricity	Machinery	Other Causes	Total Underground	Open-Cut	Surface	Grand Total
Alabama	1	..	1	..	1	..	..	..	3	..	1	4
Arkansas	..	..	..	6	..	..	..	..	6	..	..	6
Colorado	..	..	1	..	..	..	..	..	1	..	..	1
Illinois	3	..	..	..	2	..	..	4	9	..	..	9
Indiana	..	..	1	..	..	..	..	..	1	..	..	1
Kansas	1	..	..	..	..	..	..	..	1	..	..	1
Kentucky	7	2	2	..	..	..	4	1	16	..	1	17
Ohio	..	..	2	..	..	1	..	..	3	1	..	4
Pennsylvania (bituminous)	9	..	1	..	..	1	1	..	12	..	1	13
Tennessee	2	..	1	..	..	..	..	..	3	..	..	3
Utah	1	..	..	..	..	..	..	..	1	..	..	1
Virginia	1	..	..	..	..	..	..	..	1	..	..	1
West Virginia	8	..	6	61	..	..	2	1	78	..	..	78
Wyoming	..	..	1	..	..	..	..	..	1	..	..	1
Total bituminous	33	2	16	67	3	2	7	6	136	1	3	140
Pennsylvania (anthracite)	10	1	5	..	..	1	..	1	18	..	2	20
Grand total	43	3	21	67	3	3	7	7	154	1	5	160

DEATHS AND FATALITY RATES AT UNITED STATES COAL MINES, BY CAUSES OF ACCIDENTS*

January–May, 1941 and 1942

Cause	Bituminous				Anthracite				Total			
	Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons	
	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942
Underground:												
Falls of roof and coal	207	218	1.134	0.920	44	57	2.090	2.338	251	275	1.232	1.052
Haulage	68	85	.372	.359	12	13	.570	.533	80	98	.393	.375
Gas or dust explosions:												
Local	9	1	.049	.004	2	4	.095	1.64	11	5	.054	.019
Major	20	101	.110	.426	.....	.....	.....	.....	20	101	.098	.387
Explosives	9	9	.049	.038	4	4	.190	.164	13	13	.064	.050
Electricity	10	12	.055	.050	1	3	.047	.123	11	15	.054	.057
Machinery	15	13	.082	.055	.....	.....	.....	.....	15	13	.074	.050
Shaft	2	3	.011	.013	1	2	.047	.082	3	5	.015	.019
Miscellaneous	1	12	.005	.050	6	3	.285	.123	7	15	.034	.057
Stripping or opencut	13	10	.071	.042	1	1	.047	.041	14	11	.069	.042
Surface	11	17	.061	.072	7	5	.333	.205	18	22	.088	.084
Grand total	365	481	1.999	2.029	78	92	3.704	3.773	443	573	2.175	2.192

*All figures subject to revision.

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For deep mine pumps. Resists acid mine waters. Keeps grit out of stuffing box. Three types.

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Drop Forged Links

Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL COUPLINGS

PITTSBURGH
KNIFE & FORGE CO.
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Middle Fork, Illinois Landmark, Now Being Dismantled

Idle since July 3, 1924, the Middle Fork Mine, Benton, Ill., an early advocate of many preparation practices now common in the industry, has surrendered to coal more adapted to the production of steel. The hoist has been shipped to Pennsylvania and most of the other equipment and buildings have been sold to the Firman Equipment Corporation, Terre Haute, Ind., and are being dismantled.

Middle Fork mine was sunk by the Middle Fork Coal Co., organized by J. M. Seymour, Robert Ward and W. W. McCreery in 1913. Sinking of the 612-ft. shaft was completed in 1914, and in 1915 it was equipped with a 150-hp. electric hoist with Ward Leonard control. With coal supplies short, especially the coking type, the property was acquired by the United States Steel Corporation, which started operating it Dec. 16, 1916. Improvements made by the new owner included an elaborate preparation plant for better fitting the product for metallurgical purposes. Design was handled by the steel

Middle Fork headframe with part of the preparation plant behind it.

Mac Taylor (left) and Barney Cosgrove were assistant superintendent and mine manager, respectively, in Middle Fork's heyday.

HELP FOR MINES SPEEDING UP DEFENSE PRODUCTION

HOLMES EQUIPMENT
WIDELY USED

DANVILLE ROBT. HOLMES BROS. ILLINOIS

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***HOLMES MAKES** emergency repairs —a phone call will bring a Holmes representative at once—phone 1430.*

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BETTER BREAKERS built by Wilmot, and scores of Hydrotator units installed by Wilmot in modernized breakers, are aiding the "all out" program of Anthracite producers to meet all war time demands for heat and power. The Wilmot Engineering Co., Hazleton, Pa.

IF IT'S HYDROTATED IT'S CLEANER COAL

WILMOT
A GREAT NAME IN THE COAL INDUSTRY
HYDROTATOR
COAL *Preparation* UNITS

PROTECTING WIRE ROPE AGAINST CORROSION

This is Number 11 in a series of informative articles prepared by Macwhyte Wire Rope Company. The purpose of this series is to help wire rope users in these critical times to get the longest possible service from present ropes . . . through making useful facts on rope care more widely known.

The preceding article, No. 10 in this series, pointed out the causes of wire rope corrosion, where and when it was likely to strike. This article, No. 11, tells how to guard against corrosion. This and the previous ten articles in the series is available on request on your company letterhead.

Lubrication . . . its importance

No way has yet been found to remove the "causes" of corrosion. However, there is a method of protecting wire rope against corrosive elements . . . against atmosphere, weathering, or special conditions which subject the rope to either acid or alkaline substances.

That method is . . . *thorough lubrication.*

A recent and good illustration of such protective practice is found in the automotive industry. When car makers turned their plants into war production centers they ripped out massive automobile dies and machines worth millions, carted them to parking lots for the duration. When peace comes, back to work they will go.

Meanwhile these machines and dies are being protected against corrosion by a *thick coating of grease.*

Wire ropes, too, are machines. When in use (and more so when inactive) their parts need the protection good lubrication gives. Only when protected by lubrication (which retards corrosion) will they give the best possible service. Today, when we must all conserve what we have, such protection is doubly important.

Corrosion starts as soon as wires and strands are exposed to the elements and usually starts before one is aware of it.

In its early stages, corrosion is difficult to detect. The first signs are general discoloration of the wires of the rope. As corrosion progresses, the wires will become either pitted or covered with a reddish brown substance depending upon whether the corrosion is of an acid or alkaline type.

To prevent such destruction... LUBRICATE

Destruction came to these wire ropes much too soon. It might have been prevented. At an early inspection periodic lubrication would have added countless hours to the service life of these ropes.

A *This sample,* in addition to showing evidence of wear, is very badly corroded due to having been subjected to corroding conditions of an alkaline nature.

B *Lack of lubrication* caused the wires in this rope to become rust-bound. Fractures of this character occur when suddenly picking up the load or when the rope is flexed over the sheave, because the rust-bound wires cannot properly slide by each other. Notice the wires show very little evidence of wear.

NO. 632

Curb Corrosion and Conserve Steel

Corrosion is like an incurable disease which creeps up on a person gradually. You may check the damage it is doing, but you can never repair the damage done. Eventually it leads to early death of a rope whose service life could have been so much longer . . . with ordinary care.

Today corrosion is a very real enemy, destroying vital material (steel) needed for victory. If you inspect your ropes regularly, and apply lubricants freely, frequently, you are doing your bit to defeat this wire rope saboteur and get maximum service from your wire rope.

If you have further questions on corrosion (or any wire rope problems) feel free to write us about them. Simply address Macwhyte Company, 2940 Fourteenth Avenue, Kenosha, Wisconsin. Please write on your company letterhead.

MONARCH Whyte Strand PRE-FORMED WIRE ROPE

Macwhyte's premier wire rope, famous for its strength, toughness, and internal lubrication

Made by

MACWHYTE COMPANY

2940 Fourteenth Avenue • Kenosha, Wisconsin

New York • Pittsburgh • Chicago
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Distributors throughout the U. S. A.

Macwhyte Company Manufactures:
MACWHYTE PREformed and Internally Lubricated Wire Rope
MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Cable
MACWHYTE Braided Wire Rope Slings
MACWHYTE Cables, Tie Rods, Terminals, for Aircraft

WHEAT

The Engineered Cap Lamp

Here are the features . . . judge for yourself!

1. Two bulbs (one for emergencies) — miner is never in the dark.
2. Center mounted, Krypton-filled bulb, gives 20% more light — no dark "shadow spot" in beam.
3. Choice of 3 reflectors gives narrow concentrated beam, a medium beam, or a widespread beam of light — suits all working conditions.
4. Headpiece weighs less than 6 ounces, Lamp Cord 6 ounces, Battery 62 ounces — Total weight of Lamp complete 74 ounces.
5. Headpiece molded of strong bakelite; sealed, moisture-proof and dust-proof.
6. Rubber battery case — non-conductor of electricity — a valuable safety feature.
7. Battery solution (free) limited to one ounce total both cells.
8. Lead-acid type battery maintains high voltage throughout shift (80+% efficiency) — year after year.
9. Battery charged through headpiece and cord of cap lamp — a daily test of all connections.
10. Designed for self-service charging system for lowest lamphouse operating cost.
11. To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart — unit-sealed construction.
12. A payment plan (purchase or rental) to meet the requirements of companies — large and small.

Note — More New Wheat Cap Lamps were installed in the U.S.A. during 1940-1941 than in any previous 2-year period

Write today—

WHEAT LAMP SALES, INC.

1501 Kanawha Valley Bldg., Charleston, W. Va.

SPECIALISTS IN MINE LIGHTING FOR 25 YEARS

KOEHLER MFG. CO.

Marlboro . . . Mass.

company's engineering department, and the washery went into service in 1918.

From the dump the coal went through a crusher and onto a belt to a large concrete storage bin. Additional belt equipment took the coal to the washery, where it was cleaned, reduced to one size, dewatered and delivered to the single loading track. Shipments aggregated about 3,000 tons per day over the Illinois Central R.R. to plants in the vicinity of Chicago.

The Middle Fork washery is reputed to have been the first to use both horizontal and inclined belt conveyors for handling coal. Also, the first application of coal-washing tables to reclaiming very fine coal in Illinois is credited to Middle Fork. Three thickeners were installed for water clarification, and centrifugal dryers were adopted for dewatering the entire product.

•

Bootleg Tonnage Cut to Half; Agreement Extended 60 Days

Production of bootleg anthracite was cut 50 percent during the first six months of 1942, according to a report by Mark S. James, Secretary of Commerce of Pennsylvania. He also stated that the number of holes where this tonnage is mined were reduced by 266 in May and June, leaving a total of 1,869 on July 1.

"Purchases of bootleg coal by legitimate mining companies for preparation at their breakers have recently been averaging about 40,000 tons a week," he said. "With 60 percent of the bootleg coal going to legitimate breakers, this would indicate that in 1941 the output averaged around 67,000 tons per week. Considering the fact that all holes do not operate every day, it is estimated that the current rate of production is about 2,500,000 tons of commercial coal annually. This is less than half of the 1941 production of slightly over 5,000,000 tons."

The Anthracite Committee voted on July 13 another 60-day extension of the agreement authorizing legitimate collieries to purchase the output of bootleg operations without jeopardizing their production quotas under the allocation plan. This is the third extension and the arrangement will expire Sept. 30 unless renewed again. A spokesman for the committee said: "The bootleg miners are giving us every cooperation, and I feel they want to get rid of the illegal industry just as much as we do. When this extension expires, at the end of September, we'll have less than 1,000 bootleg holes operating."

Letters to the Editor

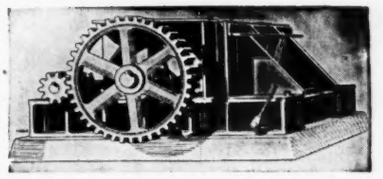
The July issue of *Coal Age* contained an article on how Pittsburgh Coal Co. was cooperating with the WPB in disseminating views of WPB officials by means of a public-address system. Perhaps some of your readers would be interested in the set-up. Following is the type of equipment used:

1 standard broadcast radio set, such as the Sentinel, 5- or 6-tube, 120-volt a.c.-d.c. table model, approximately	$19.00
1 public-address amplifier with built-in phonograph record player, such as the Bogen E 620 T, 20 watts, for operation on 110 volts a.c. and 6 volts d.c., approximately	75.00
1 crystal microphone, such as the Shure 730 A, approximately	21.00
1 microphone stand, such as the Shure B 10, height 44 in. to 71 in., approximately	5.00
1 outdoor horn, such as the University LH, approximately	20.00
1 driver for above horn, such as the University SAH, approximately	20.00
Total, approximately	$160.00

The radio, amplifier and microphone usually are used indoors with the loudspeaker permanently mounted on a pole outdoors. The microphone is connected to the amplifier by 25 ft. of cord and may be moved that far away from the amplifier. Also, the 110-volt power-supply wires may be extended and the amplifier moved, where it is desired to use the microphone outdoors. By placing the microphone close to the radio set any radio program that is received can be put on the public-address loudspeaker. The amplifier can be operated from an automobile storage battery if desired. If a bat-

Part of the Pittsburgh Coal family listening to war-production messages at the annual picnic

A NEW VERSION OF AN OLD TYPE



"PENNSYLVANIA" TYPE "K" SINGLE ROLL COAL CRUSHER

With this advanced design, in rugged STEELBUILT construction, far more accurate sizing is possible to meet Code requirements through quick adjustability, in a range from ¾" to 8".

Further—real protection is provided by improved Safety Toggle Equipment, which quickly passes Tramp Iron, and instantly returns Breakerplate to crushing position.

Seven (7) sizes afford a capacity range from 50 to 1000 tons per hour.

Send for Bulletin No. 2006.

Also,— **"PENNSYLVANIA" BRADFORD BREAKERS, BRADMILLS, GRANULATORS, HAMMERMILLS**

PUT YOUR COAL PREPARATION PROBLEMS UP TO US.

PENNSYLVANIA CRUSHER COMPANY

Liberty Trust Bldg. Philadelphia

Representatives in Principal Centers.

Most Mines use Caladd

The scientific chemical treatment for permanently dust-proofing Coal. It forms a film!

The Johnson-March Corp.

52 Vanderbilt Ave. New York, N. Y.

tery-operated radio is used, the complete outfit could be used where no other power than batteries was available.

Six indoor-type loudspeakers have been installed permanently in one large assembly room at one mine. The amplifier and microphone are moved to this assembly room when meetings are to be held. The radio amplifiers, microphone and phonograph records are housed in a wood cabinet that can be locked and which facilitates transportation of the equipment. The microphone listed is of the directional type, which has been found preferable to the non-directional because there is less opportunity for feed-back whistling.

Twelve public-address systems now are in service. Several of them have been working 18 months. Only two cases of trouble have occurred and both were due to mishandling the equipment. The sets have been very useful in conducting large meetings. Also, in some cases, the equipment is used daily to transmit radio programs, especially baseball broadcasts, to the men waiting for the man trip. Prices listed for the equipment may be somewhat higher now and some of the equipment may be very difficult to obtain at the present time.

We are inclosing two photographs of the crowd at the annual picnic of the employees of the company and their families held June 20 at Kennywood Park (Editor's Note—one reproduced herewith), at which time the messages of Messrs. Donald Nelson, Wilbur Nelson and Eastman were put on the public-address system of the park. There are loudspeakers placed at vantage points throughout the park, so the entire crowd was able to hear the three recordings.

R. E. CHARLIER,
Industrial Relations Manager,
Pittsburgh Coal Co.

•

Now, with our country in the greatest struggle in history to uphold freedom, democracy and liberty, we need coal, coal and more coal—coal which is ammunition. Now is the time we should strive to get more production with lower cost, which can be done efficiently.

Here is one way we can do it. Suppose we have a section with two or three shifts. Each shift has a different unit loading number, such as X11, X12, etc. Each shift tries to outdo the other in cars of coal all right, but in so doing leaves the oncoming shift with very little coal to start with. Therefore, its production will be down.

If all the coal coming from one section was on one unit loading number, which would take in the Joy number, the section would get credit instead of any one crew.

Working section cycle with standard leave.

We don't all get the same break because one shift may have more track, cable or machine trouble, etc. From past experience, I know that bits, splice bars, track bolts, tape and spikes are hid in the gobs and never found, because each crew tries to keep them for themselves. By loading on one number, all these supplies would be out to help the other fellow instead of being hid to knock him down. Therefore, we would have more production with lower cost.

We should have at least seven working places. Seven working places with a system of standard leave should produce 200 tons per shift with ten men to a unit. What I mean by a standard leave is this: Joy in a cut of coal; one cut of coal shot down; one place ready for cutter; one place cleaned up ready for the timbermen; one place trimmed ready for the slate men to gob, etc.

The said section must be worked on a cycle. By so doing, we can keep a uniform fracture line, which will eliminate squeezes and creeps. The highest quantity of coal can be recovered at the lowest cost.

HARRY NORTHOVER,
Face boss, National No. 1 mine,
Morgan, Pa.

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Specialist in examination and valuation of bituminous coal properties; Investigations of operating conditions, costs and markets; development of mineral resources.
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MINE MANAGEMENT
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A NEW Employee Yesterday... "ALL THROUGH" Today

A Pair of AO Goggles Would Have Prevented it!

When you train a new employee, drive home the urgent necessity for proper eye protection. Emphasize the serious chances he takes — the grave risks he runs — when he fails to safeguard his eyes. For if he neglects wearing goggles, he may be "all through" his first day on the job—and you lose in man-power, training time, and compensation costs. Next time your Mine Safety Appliances Representative calls, ask him to show you how AO Goggles are saving money in other mines. Have him work out a systematically planned eye protection program for your operation. You'll find it a profit-producing investment.

American Optical

COMPANY

SOUTHBRIDGE, MASSACHUSETTS

An Emergency Statement

to Industrial Executives

Manufacturers—large and small—have a special opportunity to aid the war effort—over and beyond the contribution they are already making.

That opportunity is Salvage.

No matter how much scrap is dug out of the attics and basements of homes, the fence corners and gullies of farms, war production factories will still fall far short of the scrap material needed unless the manufacturers of America get 100 per cent behind the program.

Six million additional tons of scrap iron and steel alone, as well as vast quantities of rubber and other materials, are urgently required to bring our war program to full strength.

Whether you are a lace curtain manufacturer or a maker of drop forgings the obligation is the same.

The job is more than simply collecting scrap material around the plant, or turning in the scrap which is created on the premises. It is a job of condemning obsolete machinery, clearing out unusable stocks, obsolete tools, dies, drills, fixtures, etc.

All unusable material, equipment, and stocks should be scrapped at once and put back into war production.

The philosophy of "It may come in handy some day" must give way to the doctrine of "My country needs it now."

Patriotic volunteer committees of executives are already hard at work on this problem in 421 industrial centers.

The Industrial Section of the Conservation Division has a corps of technical advisers who are prepared to work with all types of industries.

A thoroughgoing Salvage program in a factory can not only help meet the present emergency, but can help prepare that factory for its postwar operations through the elimination of once wasteful practices.

1 The first thing to do is to put some one individual in charge of Salvage in all departments of your business and give him not only the responsibility to act, but the authority to act.

2 The next thing to do is to get in touch with your local Industrial Salvage Committee and map out a detailed program with the materials and ideas that are available. Their program contains 17 simple steps.

If in any doubt, write or wire at once to the Conservation Division, War Production Board, Railroad Retirement Building, Washington, D. C.

This job is being tackled by a democratic nation through the volunteer efforts and initiative of democratically managed industrial concerns, rather than through directives or compulsion as it is done in Axis countries.

Every executive, every superintendent, every foreman and every worker in every plant can help.

The main thing is to get started now.

All unusable material, equipment, and stocks should be scrapped at once and put back into war production. Please read this message and act **now.**

D. M. NELSON, CHAIRMAN, WAR PRODUCTION BOARD

This message approved by Conservation Division

WAR PRODUCTION BOARD

This advertisement paid for by the American Industries Salvage Committee (representing and with funds provided by a group of leading industrial concerns).

SCRAP FROM HOMES AND FARMS—As individuals, search your home from attic to basement. Search your garage. Look at the old familiar things in a new light. Do you need them—or can you get along without them? Your country needs every pound of scrap iron and steel, other metals, rubber, rags and burlap to provide the fighting materials our armed forces must have. Take your scrap to the nearest Salvage Depot—give it to a charity—or sell it to a Junk dealer. . . . If you live on a farm, consult your County War Board or your farm implement dealer. In any case, your scrap will flow back into the blood stream of our war production.

PEAK PRODUCTION TONNAGE AIDS

Pioneers in Electrical Protection

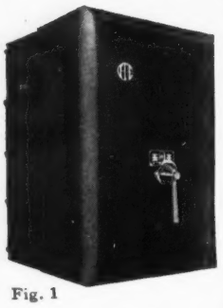


Fig. 1

Type KB air circuit breaker for mining service, available for both a-c and d-c circuits.

Developments of the past ten years in mining methods have led to a very wide use of I-T-E air-immersed circuit breakers and switchgear. Consistent study of mining problems has kept I-T-E in the forefront with the result that I-T-E equipment has been a vital factor in mechanized practices. An example of I-T-E efforts to prepare for new needs is the Type KB circuit breaker (Fig. 1)—an extremely compact and rugged circuit breaker capable of meeting a wide variety of service conditions.

Automatic Reclosing Circuit Breakers

The leading position which I-T-E holds in supplying automatic reclosing circuit breakers for mining applications has been gained and held through constant study of mining needs by I-T-E engineers. Type KSA is for substation use in protecting and controlling semi-automatic or full automatic M-G sets, rotary converters and mercury-arc rectifiers. Type KSC is used in sectionalizing service to localize faults. Sectionalizing provides for maximum production at reduced cost for power, for electrical maintenance and machine repairs.

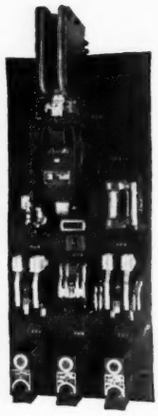


Fig. 2

Fig. 3

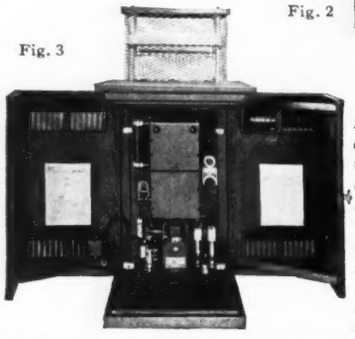


Fig. 2 (above) shows a Type KSA automatic reclosing circuit breaker for substation service. Fig. 3 (left) is a Type KSC automatic reclosing circuit breaker for sectionalizing service. Steel enclosure is open.

Automatic Switchboards for Mines

I-T-E has designed and built many switchboards in recent years for semi-automatic or full-automatic protection and control in connection with local generating systems or purchased energy. The switchboards are for service with M-G sets, rotary converters and mercury-arc rectifiers. Much of the equipment, including circuit breakers and protective relays, has been designed specifically for mining service. Mounting is simplified and there is much flexibility in space arrangements. A typical installation is at right, above.

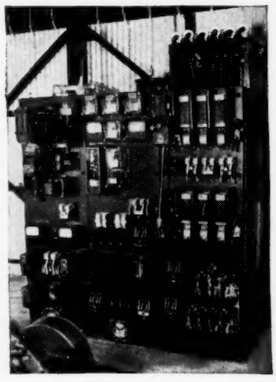


Fig. 4. *Typical mining switchboard designed and constructed by I-T-E and shipped ready for installation.*

Load Distributors

With the need for uninterrupted power service in order to gain peak tonnage in mechanized mines, it is necessary to avoid frequent opening of circuit breakers, particularly those outages arising from unequal distribution of load among widely separated substations operating in parallel. I-T-E Type LDR Load Distributor improves service from two or more M-G sets or rotary converters in parallel on same system. Generator loads are balanced to prevent overheating, outages are reduced, peaks are limited and life of system and connected equipment prolonged.

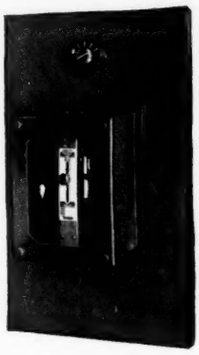


Fig. 5. *Type LDR Load Distributor, panel mounted, in glass front, dustproof cover.*

Trolley-Wire Protector

A rugged, manually operated circuit breaker protects 4–0 and 6–0 trolley wires, reducing fire hazards and preventing the annealing of wires.

I-T-E

AIR SWITCHGEAR

IMMERSED IN AIR • ENCASED IN STEEL

Representatives in Principal Cities

CIRCUIT BREAKER CO., PHILADELPHIA, PA.

Built by GENERAL ELECTRIC CO.

SKF

BALL AND ROLLER BEARINGS

"Production!"

. . . the PASSWORD *at* SKF

Step inside SKF factories any hour of the day, any day in the week, any week in the year, and you'll find every man and machine concentrating upon Production. You'll find them producing battle-bound bearings in great quantities, but you'll also find them turning out bearings for peacetime equipment on wartime jobs—equipment like this motor on a mine locomotive. To build a bearing that can keep an armature in correct position, permanently maintain the initial air gap, and promote long motor life is as important in its way as making a bearing that can take the concussion of a big gun, the high speeds of an airplane engine, or the shocks of a ravaging tank.

5097

SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILADELPHIA, PA.

COAL GETS ON

Thanks to these 3

1. VENTUBE

TODAY'S all-out production requirements make the need for adequate auxiliary ventilation greater than ever. Workings are more concentrated, faces move faster, more machinery and electrical equipment are employed in the face zone, the rate of dust liberation in a working place frequently is increased, and more men are often required in a single room or other opening.

The ventilation system thus carries a much greater responsibility, particularly between main current or split and the face. A positive, efficient auxiliary system, made possible by Du Pont "Ventube,"* insures safe and healthy surroundings for miners and thus promotes efficiency and cuts costs. Try a few sections of "Ventube" in your toughest working. See how efficiently it works . . . how it helps you speed up work and cut costs. Facts and figures will gladly be sent on request.

*"Ventube" is Du Pont's registered trade mark for its rubber-impregnated flexible ventilating duct.

"VENTUBE" HELPS PROVIDE CLEAN AIR, IMPROVES EFFICIENCY, CUTS COSTS.

2. PERMISSIBLE EXPLOSIVES

ARE you out to load more tons per shift? Then take a look at the picture on the right. This is an entry 12 ft. wide, sheared on the right rib and shot with two holes, two sticks of "Lump Coal C"† to the hole. Note the excellently sized coal—how the blast rolled it out from the face for fast loading and minimum wear and tear on the loader.

Shots like this explain why U. S. coal mines bought more "Lump Coal C" last year than any other permissible. There are other reasons, too, for this popular permissible shears ribs clean, practically eliminating tight or hanging shots. It has remarkable spreading action, frequently permitting fewer drill holes per working face—and it has excellent fume characteristics, an important feature in mechanical loading mines.

"Lump Coal C" has earned its place in coal mining on merit alone. Undoubtedly, it can do a real job for you, too. We'll be glad to demonstrate—just call in the nearest du Pont representative.

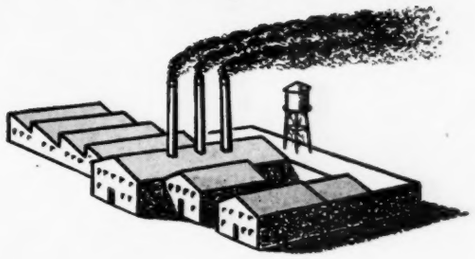
†Trade Mark

DU PONT
REG. U.S. PAT. OFF.

E. I. DU PONT DE NEMOURS

THE JOB FASTER!

du Pont products



3. C Z C

THE photograph on the right tells the story of two mine props after the same length of service. The one on the left (full-length view) was treated with Du Pont "CZC" (Chromated Zinc Chloride), the other was not!

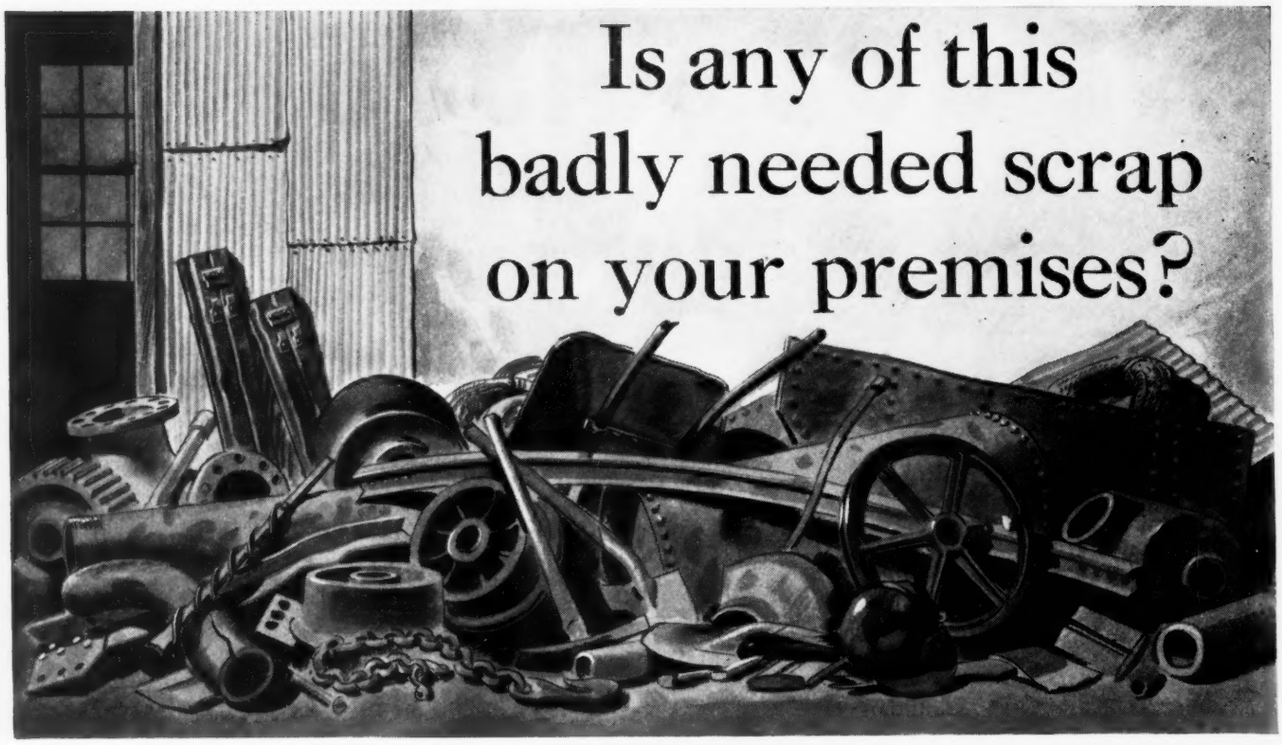
This is a forcible demonstration of the advantage of treatment with "CZC." It not only saves money by making ties and timber last much longer, but actually speeds production by cutting down on time-out for repairs and by avoiding the breakdowns that interrupt haulageway traffic.

In addition to giving mine timber great resistance to decay, "CZC" treatment makes it fire retardant and leaves timber clean, odorless and safe to handle. You'll find "CZC" a paying proposition for cribbing, lagging, shaft timbers, air course timbers, haulageway ties and fire stops—in short, for all timber above and under ground. For more information, send for your copy of the booklet "Wood Preservation for Mines."

"LUMP COAL C" BRINGS DOWN GOOD SIZED COAL, ROLLS IT OUT FOR FAST LOADING.

"CZC" TREATED PROPS LAST LONGER, SAVE MAINTENANCE TIME. UNTREATED PROP ON RIGHT FAILED DUE TO DECAY.

& Co. (Inc.), WILMINGTON, DELAWARE



WAR has a bottomless appetite for steel. This year our industry must produce even more steel than it did last year. This means not only more pig iron—but more scrap iron—at least six million extra tons of it!

Part of it may be on your premises! Do your part in putting this scrap to work. Comb every square foot of ground, every building, every pit—any place where even the smallest piece of scrap iron may be lying idle. Look for both these types of scrap:

Dormant Scrap—Unused or abandoned equipment, broken or worn-out machine parts, old boilers, discarded wire rope, booms, buckets, hand tools, rails, spikes, steel ties, steel timbers, electrical equipment, engines, cars, trucks—you probably can add to this list yourself.

"Rainy-Day" Scrap—the hardest of all to part with. Includes obsolete machinery, unused metal buildings, stacks, outdated tools — idle now because they're being saved for possible use in some indefinite future emergency. The emergency is here! This metal should be scrapped, unless it can be reconditioned and put to work now.

How to organize your own scrap drive . . .

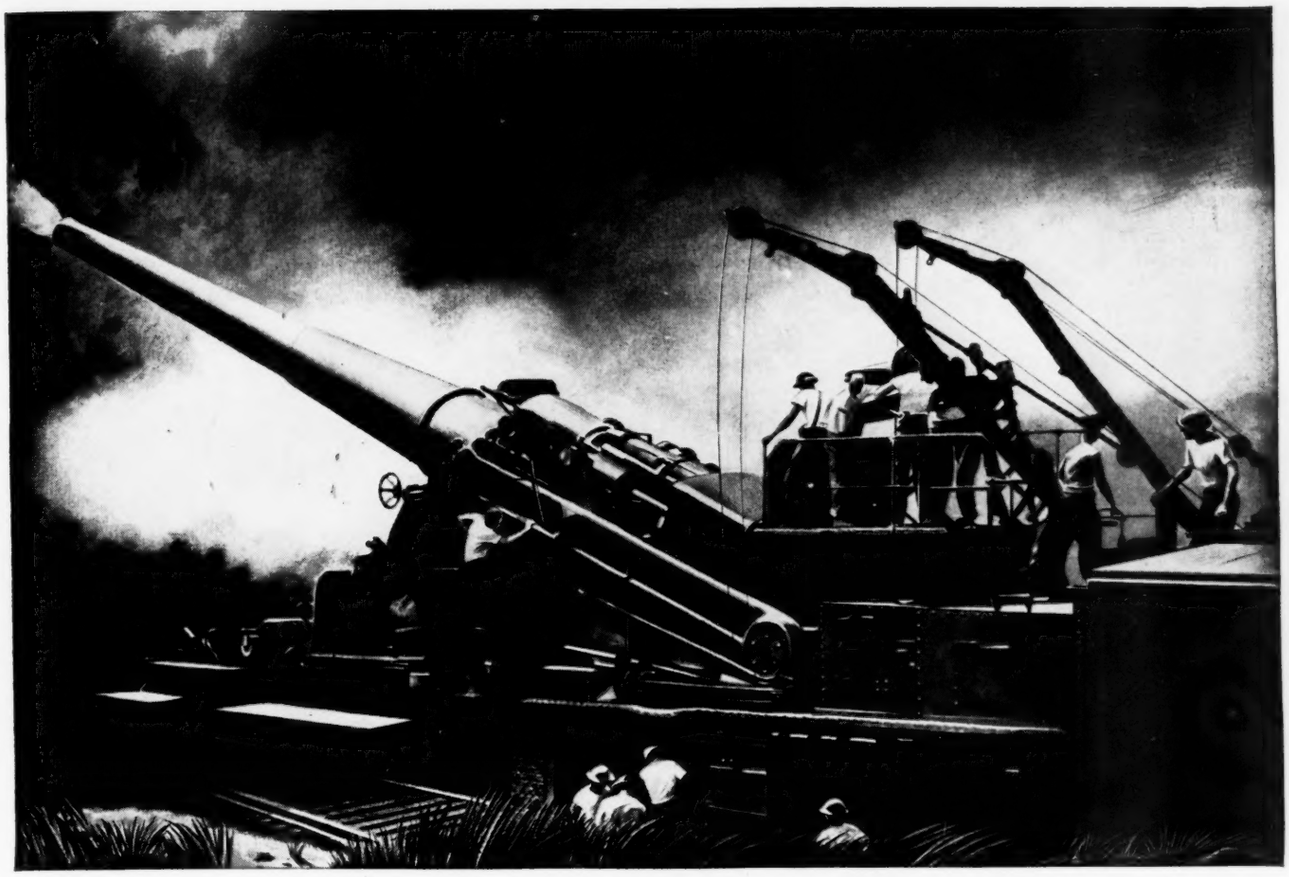
1. Put some one individual in charge of salvage in all departments of your business, and *give him the authority to act.*
2. Organize a forceful program, with the help of your local Industrial Salvage Committee.
3. Promote the drive to all employees. Dramatize it with posters, incentive systems. Make everyone "scrap conscious."
4. Emphasize *speed* and *continuous effort.* The quicker scrap gets to steel mills, the faster tanks and ships get into action. And it must *keep on coming,* as long as the war lasts.
5. For help or further information, contact your local W.P.B. office, or write to the Bureau of Industrial Conservation, War Production Board, Washington, District of Columbia.

★ *YOUR SCRAP IS WORTH ITS WEIGHT IN VICTORY* ★

By organizing a thoroughgoing salvage program now, you'll not only serve your country, but you'll also bring additional income to your business and pave the way for more economical post-war operation through the elimination of waste.

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

UNITED STATES STEEL



Feeding War Dogs

ANOTHER JOB FOR WICKWIRE ROPE

We'll be glad when it's over . . . when Wickwire rope can get back to the jobs of a world at peace.

The quickest way from here to there is for us, and for you, each day *now*, to put everything we have into winning.

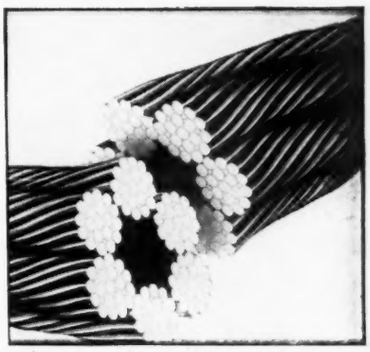
We are doing it by working day and night, seven days a week, on Wickwire Rope for our shipyards, our Liberty Fleet, the army, marine corps, coast guard and navy . . . and for industries whose production is so urgently needed.

You are contributing when you take care of your wire rope, making it last longer . . . so that there is more available for war needs.

But when you *must* have new wire rope, for war production or for essential services, ask your distributor for long-life *Wickwire* Rope. Both Wickwire regular lay and pre-formed Wissco Lay have quality that has made them famous for *low cost per year of use*. We put that into Wickwire rope by controlling every step from ore pile, through blast furnaces, open hearths, precision wire drawing, and skillful laying of the rope.

• • •

A FREE BOOK, "Know Your Ropes," is waiting here for you. More than 25,000 wire rope users all over the world consider this a bible on the selection of wire rope—*and making it last longer*. Write Wickwire Spencer Steel Company, 500 Fifth Ave., New York, N. Y.



REVERSE ROPE FOR LONGER LIFE
Frequently, most severe strain, due to close bending, occurs near one of the ends. Rope life is increased by exchanging the drum end with the load end. This and forty more rope life-savers are fully described in the free book, "Know Your Ropes."

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER

WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WISSCO PRODUCTS

TO EXECUTIVES:

NOW YOU CAN HELP

Even More...

New Treasury Ruling Permits Purchases UP TO $100,000, in any Calendar Year, of Series F and G WAR BONDS!

The Treasury's decision to increase the limitations on the F and G Bonds resulted from numerous requests by purchasers who asked the opportunity to put more money into the war program.

This is not a new Bond issue and not a new series of War Bonds. Thousands of individuals, corporations, labor unions, and other organizations have this year already purchased $50,000 of Series F and G Bonds, the old limit. Under the new regulations, however, these Bond holders will be permitted to make additional purchases of $50,000 in the remaining months of the year. The new limitation on holdings of $100,000 in any one calendar year in either Series F or G, or in both series combined, is on the cost price, not on the maturity value.

Series F and G Bonds are intended primarily for larger investors and may be registered in the names of fiduciaries, corporations, labor unions and other groups, as well as in the names of individuals.

The Series F Bond is a 12-year appreciation Bond, issued on a discount basis at 74 percent of maturity value. If held to maturity, 12 years from the date of issue, the Bond draws interest equivalent to 2.53 percent a year; computed on the purchase price, compounded semiannually.

The Series G Bond is a 12-year current income Bond issued at par, and draws interest of 2.5 percent a year, paid semiannually by Treasury check.

Don't delay—your "fighting dollars" are needed *now*. Your bank or post office has full details.

Save With . . .

War Savings Bonds

This space is a contribution to America's All-Out War Program by COAL AGE

"Wartime Dewatering" is a job for DEMING PUMPS

Impact of war on coal mining demands continuous operations with minimum delays.

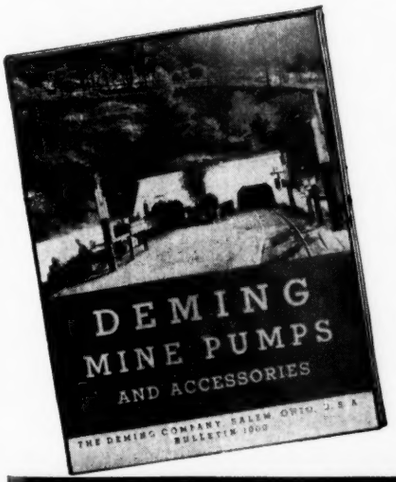
Pumping equipment for mine dewatering must be correctly matched to meet specific conditions.

Pumps must be capable of overcoming peak load demands.

Where acid water is an obstacle, pumps made to resist those conditions are vital to continuous performance.

Check up on YOUR pumping equipment NOW!

Call in a Deming representative for advice. "Wartime dewatering" is a job for Deming Pumps. There's a type and capacity for every need.



Write for Bulletin 1000 which contains important information about Deming Mine Pumps and Accessories. If the name of the nearest Deming representative is unknown to you, tell us and we will give you his location.

THE DEMING COMPANY · · SALEM, OHIO

New Book on Dustproofing Coal

• Latest Methods
• Practical Equipment

Expansion of calcium chloride treating and conversion of other dustproofing systems to calcium chloride are problems for immediate consideration.

This new bulletin gives:

Simple requirements for treating set-up — freezeproofing as well as dustproofing.

Methods and rates of application.

Evidence of non-corrosion, other valuable data.

Now is the time to act. Send the coupon.

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Bldg. Detroit, Michigan

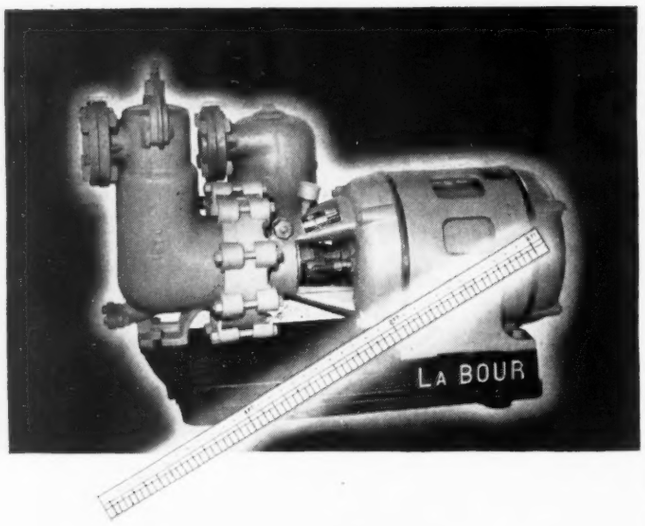
CALCIUM CHLORIDE
KEEPS COAL DUSTLESS

CALCIUM CHLORIDE ASSOCIATION, 4145 Penobscot Bldg., Detroit, Mich.

Please send me Dustproofing Bulletin No. 37 at once.

Name _____

Address _____



Measure LaBOUR with THIS YARDSTICK

When a certain make of equipment is harder to get than others made of essentially the same materials, the chances are that the hard-to-get product is worth waiting for if you possibly can. Such a condition usually means that Uncle Sam has taken his choice — and he's a pretty good judge!

Naturally, we are proud that LaBour stamina and performance have been approved by this most exacting "yardstick." We're doing everything we can to supply demand — all of which, of course, is under priority control.

So, if you think a quality pump is worth waiting for — if you want lower operating cost and minimum maintenance expense — don't take less than a LaBour if you can possibly wait.

LA BOUR PUMPS

THE LABOUR COMPANY, INC., ELKHART, IND., U. S. A.

R AND S COMPANY

Equipment FOR YOUR PARTICULAR JOB..

THERE is no other coal cleaning job exactly like yours.

R and S understands this and is prepared to recommend equipment that specifically meets your problem.

The following bulletins that outline some R and S equipment are available.

Write for them today

HYDRO-SEPARATOR
No. 156—FOR COARSE COAL
HYDROTATOR
No. 157—FOR FINE COAL
STUMP CLEANER
No. 158—FOR DRY CLEANING

There is no obligation

ROBERTS and SCHAEFER CO.
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P. O. Box 865, PITTSBURGH, PA. · 2017 "S" Street, N. W., WASHINGTON, D. C. · P. O. Box 570, HUNTINGTON, W. VA.

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for solving technical and business problems

When you want information fast—for dealing with difficult production problems, for settling special managerial questions, or for handling the "1001" situations that arise in every shop, office, laboratory and field—

get the facts — experience — data you need to solve your particular problems from

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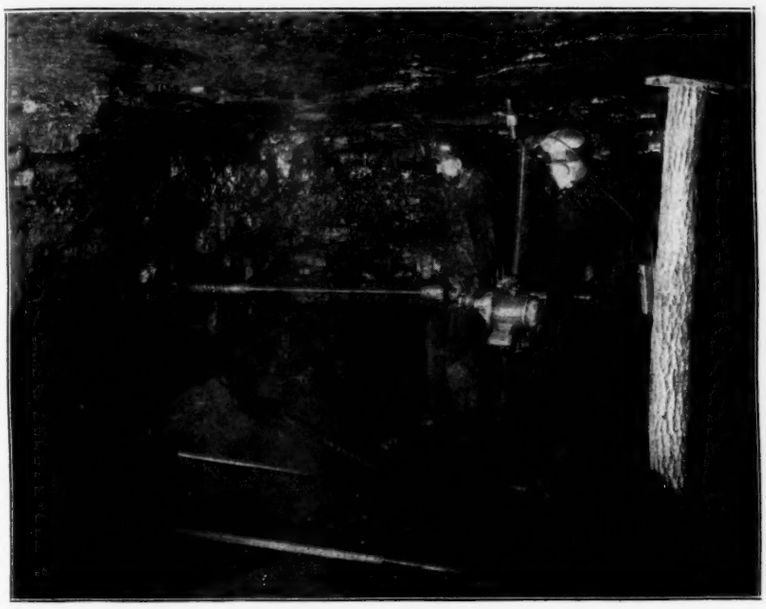
INDIANA MINE AVERAGES 90 HOLES PER SHIFT



↑ **150 7-FOOT HOLES IN 7 HOURS** is the record of a two-man crew in a well-known Indiana mine. The drill is a CP 473, Post-Mounted—one of the Chicago Pneumatic line of seven types of post-mounted and four types of hand-held electric coal drills.

ONE CREW DRILLED 150 7-FOOT HOLES IN SEVEN HOURS

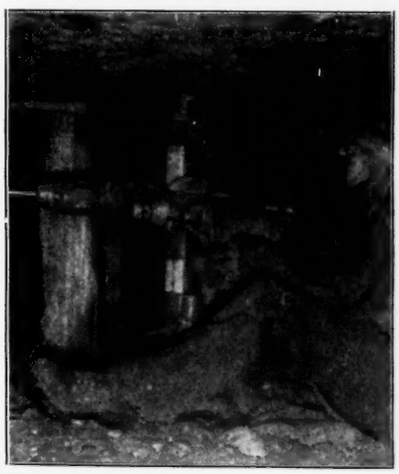
CP Electric Drills Speed Output

INDIANA (CP)—Ninety 7-foot deep, 3½" holes per shift and eight to ten 24-foot wide places is the daily average in a well-known Indiana mine using CP Post-Mounted Electric Coal Drills. This average is frequently bettered, one two-man crew having drilled 150 holes in a single seven-hour shift.

Similar drilling performances are being recorded with CP Post-Mounted Electric Coal Drills in practically every seam and formation. Write for complete data.

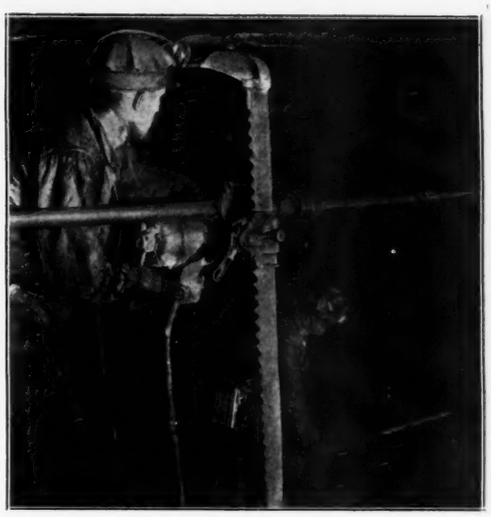
CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 E. 44th St., New York, N. Y.



↑ **LOW DRILLING** is easy, fast with CP Drills. Illustrated is the CP 472 Open Type Post-Mounted drill in 3-foot Kentucky Seam.

←**HIGH DRILLING** is equally easy and fast with CP Coal Drills. Top drilling and breaking down in a Utah mine, 22-foot seam; CP No. 574 Post-Mounted Electric Coal Drill.



↑ **7½-FOOT HOLES IN 2½ MINUTES;** four holes per 24-foot place — nine places per shift — is the performance of CP Electric Coal Drills in Eastern Ohio field.

CHICAGO PNEUMATIC

ELECTRIC COAL DRILLS

ALSO: Air Compressors, Pneumatic Tools, Electric Tools, Rock Drills, Hydraulic Aviation Accessories, Diesel Engines

POST-MOUNTED
HAND-HELD
ELECTRIC AND PNEUMATIC TOOLS FOR MAINTENANCE AND REPAIR

WOOD PIPE for Mine Drainage

Wyckoff Wood Pipe has an 87 year record of perfect resistance to the corrosive action of sulphurous mine water. It is an ideal, long-time investment—light, easy to lay, and relatively low in first cost

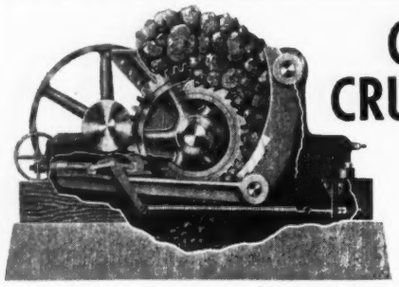
We also manufacture a special Hard Maple Pipe for flushing culm in the Anthracite Region and wood covering for underground steam lines.

shipments from stock day after receipt of order. Send for catalog.

Established 1855

Emergency orders can be delivered by Truck to Mines in Pennsylvania Coal Fields following morning after receipt of same.

A. WYCKOFF & SON CO.
Office and Factory
No. 35 Home Street, Elmira, N. Y.
The Originators of Machine Made Wood Pipe



COAL CRUSHERS

We build a type and size for every coal crushing requirement. 100 years of experience is your assurance that we know how. Quotations on request.

McLANAHAN & STONE CORP
Established 1835 HOLIDAYSBURG, PENNA.

HENDRICK

Carbondale **1600**

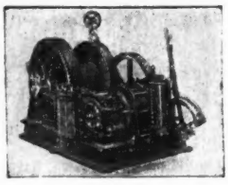
for

PERFORATED PLATE

Round—Square—Diagonal—Slot
Any perforation

HENDRICK MANUFACTURING CO.
41 DUNDAFF ST., CARBONDALE, PA
Sales Offices in Principal Cities.
Please Consult Telephone Directory

FLORY HOISTS



Manufacturers of Steam, Electric and Gasoline Hoists of all types; also parts for all model Flory Hoists.

FLORY MANUFACTURING CO.
BANGOR, PENNSYLVANIA

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Manufactured exactly to your specifications.
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We can promptly duplicate your present screens at lowest prices.

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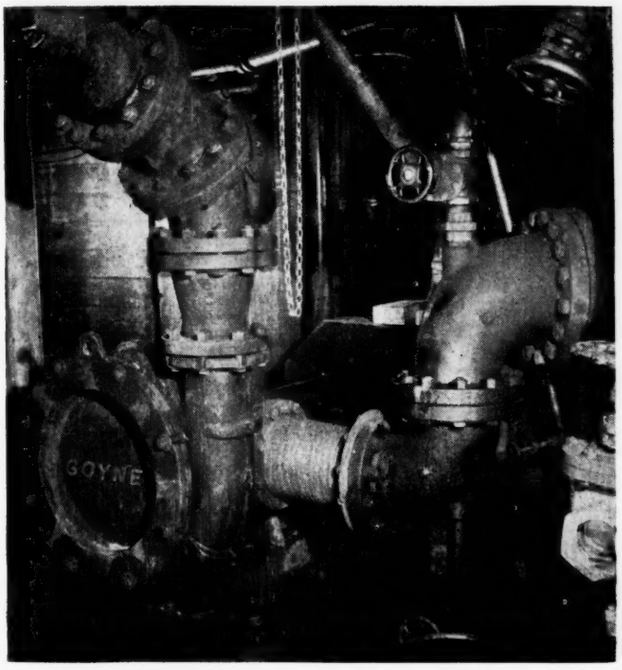
GOYNE PROCESS PUMPS



A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne:

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing only the rear head of the pump. No suction or discharge piping is disturbed.

2. The one packing box of the pump is subjected only to suction pressure and is readily kept clean by a low pressure clear water line. Long packing and shaft sleeve life is assured.

3. Impeller clearance is adjusted *while the pump is running*, insuring constant pump capacity so essential for uniform washing.

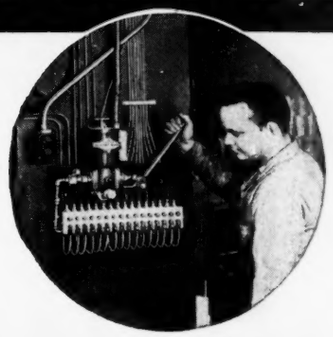
4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

All inquiries receive prompt and careful attention.

THE GOYNE STEAM PUMP CO.
ASHLAND, PA.

JUST PUSH a LEVER



LINCOLN CENTRO-MATIC LUBRICATING SYSTEM

lubricates all bearings from a single source

CUT production delays and lower your lubrication and maintenance costs by equipping your machines with Lincoln CENTRO-MATIC Lubricating Systems.

These modern lubricating systems are easily installed on new or old machines. They make it possible for *all* bearings on a machine to be lubricated from a single source, and machines can be run day and night without taking time-out for lubrication service.

A Centro-Matic System is a centralized system consisting of a number of Centro-Matic injectors—one for each bearing—and a suitable Lincoln pump for delivering the lubricant under pressure to the injectors.

The injectors may be grouped at one location or mounted separately at each bearing. In either arrangement only a single lubricant supply line is required.

The lubricant pump may be hand or power operated. Power operated systems may be semi-automatic or full-automatic.

In an installation of the type illustrated above, a man can stand beside a machine, pull a lever back and forth a few times, and a predetermined amount of lubricant will be delivered through a centralized system to each bearing on the machine.

WRITE for COPY of BULLETIN No. 888

Send us the specifications of the machinery to be lubricated. Our engineers will gladly make recommendations.

142-22

LINCOLN ENGINEERING COMPANY
Pioneer Builders of Engineered Lubricating Equipment
ST. LOUIS, MISSOURI, U. S. A.

Keep Up Coal Production with Simplex *Hold Down* Jacks

Throughout the coal regions of America, men and machines are straining to get out greater tonnage, for every extra ton of coal produced now has an important influence on our war effort.

Powerful and reliable Simplex R A 2000 Ball Bearing Anchor (or Hold Down) Jacks are doing their part in facilitating increased mine production. Their strength, utility and wide margin of safety make the Simplex Hold Down Jacks unexcelled for small, medium and heavy shaker conveyor drives, for connecting frames, troughs, guide frames and for use as fulcrum posts. For small or medium drives, 3″ standard pipe gives the best results. For heavy duty drives, a heat-treated alloy steel screw is furnished for use with 3½″ extra heavy pipe.

Simplex Hold Down Jacks are available with Toggle Head, Pointed or Ball Ends. All have 12″ travel and weigh 49 lbs. without pipe. Write for prices today.

Templeton, Kenly & Co.

Chicago, Ill.

Better, Safer Mine Jacks Since 1899

Simplex Jacks
A better Jack for every job – many jobs for every Jack

The greatest help a coal mining man can have—

IF YOU want to make sure of getting your certificate of competency—sure of winning a bigger job with bigger pay, get Beard's great books today and put them to work for you.

In these three books you have a practical, always-on-the-job guide that will help you solve the problems you face every day, show you what to do, tell you why it should be done.

Beard's Mine Examination Questions and Answers!

3 volumes — $7.50, payable in four monthly payments

THESE books explain what a man must know in order to become a mine inspector, a mine foreman, assistant foreman, fireboss, hoisting engineer, safety engineer, shot-firer, etc.

They give you complete and authoritative information about air and gases, explosives, safety requirements and methods, mechanics, engines, hoisting, drainage, pumping, ventilation, timbering, instruments, and every other detail that the practical mining man must know.

Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

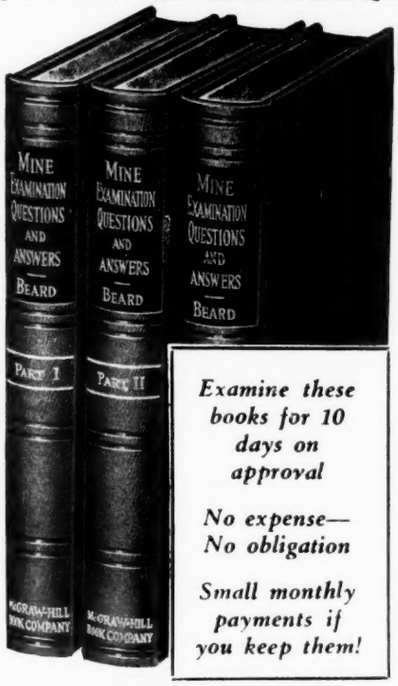
Name five duties imposed on mine foremen by law?

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 360 feet deep?

What are the advantages and disadvantages of a gasoline pump, an air pump and an electrical pump?

What is the estimated tonnage per acre, per foot of thickness, for bituminous coal?

These are but a few of the more than 2000 questions given in Beard's books together with full correct answers. Hundreds of men have used this method to prepare for higher, better jobs. You can too, if you have the Beard books and plan to use them systematically. They are the best investment that a mining man can make—not only as an aid for passing examinations but as practical reference volumes on everyday mining operation problems.



Examine these books for 10 days on approval

No expense— No obligation

Small monthly payments if you keep them!

McGRAW-HILL ON-APPROVAL COUPON

McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York

Send me, charges prepaid, **Beard's Mine Examination Questions and Answers,** 3 volumes, for 10 days' examination. If satisfactory I will pay $7.50 at the rate of $1.50 in ten days and $2.00 per month. If not wanted I will return the three volumes postpaid.

Signature .....

Address .....

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Company .....

Position ..... C. 8-42

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Coal Mine Stock For Sale
IN WYOMING

Will mine 50,000 tons this year
97% of outstanding stock offered

Reason for selling ***Retiring***

P. O. BOX 967, LARAMIE, WYOMING

DIAMOND CORE DRILLING, for any mineral. More than sixty gasoline, steam and electric drills, suitable for any job. **OUR SPECIALTY—testing bituminous coal lands.** Satisfactory cores guaranteed. Prices very reasonable.

HOFFMAN BROS. DRILLING CO.
PUNXSUTAWNEY, PA. Est. 1902 Tel. 332

WE LOOK INTO THE EARTH

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.

PENNSYLVANIA DRILLING CO.
Drilling Contractors
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TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign all Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR
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WANT TO BUY
1 to 6 **Tyler or Hummer Vibrating Screens.**
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1—200 to 300 **KW M.G. Set.**
1—50 to 60 **Ton Locomotive.**
20 **Ton or Larger Locomotive Crane.**
1—**Rotary Dryer** 5x60 or equal.
2—1300' or equal **air compressors.**
25,000 **gallon Tank on Steel Tower.**
RUSSELL STANHOPE
60 East 42nd Street New York, N. Y.

Wanted!

LOCOMOTIVE CRANES
OVERHEAD CRANES
STEEL BUILDINGS

IRON & STEEL PRODUCTS, INC.
37 years' experience
13484 S. Brainard Ave.
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"ANYTHING containing IRON or STEEL"

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When answering the classified advertisements in this magazine, don't forget to put the box number on your envelope. It's our only means of identifying the advertisement you are answering.

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COMPETENT STORE MANAGER past draft age desires position—preferably coal company store. Best references. Modest salary. PW-637, Coal Age, 330 W. 42nd St., New York, N. Y.

CHIEF ENGINEER. Experienced in mining and industrial engineering. Can handle big jobs. Presently employed but want to change. PW-638, Coal Age, 330 W. 42nd St., New York, N. Y.

MANAGER of Mining operations. Experienced in large operations. Have good safety, production, cost, and labor relations record. PW-639, Coal Age, 330 W. 42nd St., New York, N. Y.

WANTED—POSITION as Time Keeper, Weigh Boss, or Supply Clerk. Fast, accurate and reliable. Draft exempt. Best references. Write PW-640, Coal Age, 330 W. 42nd St., New York, N. Y.

MANAGER — Superintendent, graduate-engineer, 14 years varied experience, United States and abroad. Willing to consider field other than mining. PW-641, Coal Age, 330 W. 42nd St., New York, N. Y.

DESIRES A POSITION as a Mine Superintendent with a coal company in Virginia or Eastern Kentucky. Twenty five years experience as a supervisor. Reference as to ability and character. PW-642, Coal Age, 330 W. 42nd St., New York, N. Y.

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COAL MINERS CREW best experience. Looking for work anywhere. Best references. Address 646 Hegney Place, Bronx, New York, N. Y.

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Rail-River Coal Mines

In midwest available on lease basis. Address BO-628, Coal Age, 520 N. Michigan Ave., Chicago, Ill.

FOR SALE

JOY LOADER, Bradford Breaker Outfit. Four 12 Cubic Yard Sidedump Railroad Cars. Two Skips or Cages, Hoisting Engines, Steel Headframe with Sheaves. FS-627, Coal Age, 520 N. Michigan Ave., Chicago, Ill.

TRUCK MINE in good condition located on State highway. Dry conditions and plenty of coal available. Good improvements. Write or Contact — Elmer Rinsch, Freelandville, Indiana.

FAIRBANKS MORSE 2 Cyl. 100 H.P. Diesel engine also 15 H.P. speed reducer. Box #48, Stone Creek, Ohio.

FOR LEASE

1200 ACRES OF COAL

In a solid block. **Buchanan County, Virginia.** Two mile frontage on Norfolk and Western Railroad. Three **seams**, 40, 50, 75 inches. A high grade By-Product **coal. Low Ash, Low Sulphur.**

J. G. & GEORGE BUSTON, Owners
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6 YD. STRIPPER SHOVEL

200-B Bucyrus 6 years old. 75 ft. Boom, 60 ft. Dipper stick, 6 yd. Dipper Steam Shovel.

SHOVEL & DRAGLINE:
4 yd. 120 B Bucyrus Electric Shovel & 100 ft. boom Dragline
2½ yd. 100 B Elec. Shovel.

DIESEL DRAGLINES

3W 4W & 5W Monighan Walkers, 90 to 110 ft. booms.
3 Yd. P.&H. 900, 97' boom.
2½ Yd. 48B Bucyrus 80' boom.
2 Yd. 750 Lima, 60' boom.

AIR COMPRESSORS:
(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft.
(12") Belted, 360, 676, 870, 1000, 1300 ft.
(12) Diesel 105, 315, 520, 676 & 1000 ft.
(6) Electric, 1300, 1500, 2200, 2600, 5000 ft.
(14) Gasoline, 110, 160, 220, 310 & 370 ft.

COAL CRUSHERS:
Jeffrey Single Roll 18x18, 24x24 & 30x30
Link Belt 26x24 Double Roll Crusher

HYDRAULIC CARWHEEL PRESSES:
100 Ton, 150 Ton, 300 Ton, 300 & 400 Ton Caldwell - Niles - Wood - Watson Stillman

RUBBER CONVEYOR BELTS:
1000' 60", 600' 30", 300' 20", 1600' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14".

CONVEYOR PARTS:
Idlers, Head & Tail Pulleys, Steel Frames, Tripper, etc., 14 in., 60 In. Large Stock here.

SYNC. MOTOR GENERATORS & ROTARYS:
100 KW Ridgway 1200 RPM 3/60/2300/250-275
150 KW G.E. 1200 RPM 3/60/2200-250-275
200 KW Ridgway 900 RPM 3/60/2200-250-275
3—100 KW G.E. 275 v. 1200 RPM Rotarys

STORAGE BATTERY LOCOMOTIVES:
2½ ton Whitcomb 24 ga. New Batteries
2—4 ton G.E. 30 in. ga.
3—5 ton Mancha 30 in. ga.
4—5 ton G.E. 36 in. ga.
3—7 ton Goodman 36 ga. Battery & Trolley
8—6 ton Baldwin Westgh. 42 ga. & 36 ga.

TROLLEY LOCOMOTIVES:
2½ ton Westinghouse 24 ga.
4—6 ton & 3—5 ton Goodman 36 ga
3—6 ton Goodman 30 ga.
4—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
2—8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey

VIBRATING SCREENS:
9 Tyler Hummer 3x6, 4x5, 4x8 & 4x10
2 Robins Gyrex 4x8½
4x12 Niagara, 3x8 L. B., 5x6 Simplex

CARS:
120—4 ton 42 ga. S.D. Mine Cars
60—Western 16-20-30 yd. Side Dump

SHOVELS, CRANES & DRAGLINES:
3 W 90' Boom, 6 W 160' Boom, Model 6150, 175' Boom, Diesel, Monighan Walkers
1 yd. K 30 Link Belt 50' Boom Crane
2 yd. Page 70' Boom Diesel Dragline
1¼ yd. Marion 450 Elec. Shovel
1½ yd. Lima Diesel Shovel & Dragline
2 yd. Link Belt Elec. Shovel & Dragline
25 ton Browning 50' Boom Loco. Crane
7 Conway 20A, 30A, 50A, 60 & 75 Muckers

MINE LOADERS:
Junior Joy 36 ga. Low Pan
Conway 20 Mucker
3—5 BU & 7 BU 36 or 42 ga. Joy
9—Goodman 260 & Jeffrey 44L

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5'x160' Traylor Rotary Dryer
100 HP G.E. 3/60/440 r.-900 RPM Elec. Motor
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Clamshell Buckets ¾, 1, 1½ & 2 yd. Cap.
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7—8-ton Locomotives, G. E., Westinghouse and Jeffrey.
5—10-ton Locomotives, General Electric, Goodman and Jeffrey.
4—15-ton Locomotives, Westinghouse, General Electric and Jeffrey.

The above locomotives are completely rebuilt—36" to 48" gauge.

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2—300 KW G. E. Synchronous Rotary Converters, type HCC-6, form P, 1200 RPM, 250/275 volt DC, switchboards and all necessary switchgear, including 2300 volt transformers.

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1—Goodman type 97-30, 30" Belt Conveyor, 1000' centers, 121 intermediate sections.
1—Goodman type 97-30, 30" belt conveyor, 959' centers, 117 intermediate sections. Practically new.

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15—5-BU Joy Loading Machines. Perfect operating condition.
15—G-20 Goodman Automatic Duck Bills. Practically new.

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25—Sullivan CE-7 AC, 220/440 volt. Just taken out of service. Excellent condition.

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Charging M. G. Sets & Panel for each loco.
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Goodman Standard & Universal.
AC & DC Rebuilt & Guaranteed.
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CE-6 Sullivan 250 v. DC.
CE-7 Sullivan Shortwall 250 v. 6' bar
1—GOODMAN DUCKBILL.

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6 ton Atlas 220 v. 3 ph. 60 cy. 36" ga.
10 ton Milwaukee GASOLINE
15 ton West. 500 v. 40" ga.

ROTARY CONVERTERS
1—500 kw. G.E., type HC-8, 600 volt, 900 rpm. complete with transformers and switchboards.
200 kw. G.E. 275 v. DC 900 rpm. complete with transformers.
150 kw. West. 250 v. 1200 rpm 2200/3/60.

TRANSFORMERS
3—1500 kva. Pgh. 22000/6600/1/60.
3—150 kva. Pgh. 23000/6900/1/60.
1—150 kva. G.E. 2200/220-440/3/60.
3—150 kva. Pgh. 6600/550-440-220/1/60.
1—100 kva. West. 2200/220-110/1/60.
4—50 kva. Allis Chal. 11430/6600/550/440/220/1/60.
3—50 kva. G.E. 6600/575/1/60.
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2—50 kva. G.E. 2200/220-440/1/60.
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Thomas, 3 HP ratio 100:1
Cleveland 600 AT 10 HP. ratio 90:1
Falk, 150 HP ratio 7.31 to 1.
Kerr, [illegible] HP ratio 3800 rpm. to 720 rpm.

230 V. D.C. MOTORS

HP.	Make	Speed
125	G.E.	1750 rpm.
100	West.	250
85	G.E.	530
75	West.	1700 rpm.
75	West.	475
75	Reliance	1750
50	West.	975 rpm.
50	West.	1700 rpm.

M.G. SETS—SYNCHRONOUS
200 kw. West. 600 v. DC 600 rpm. 2200/3/60.
150 kw. West. 275 v. DC 600 rpm. 2200/3/60.
125 kw. Cr. Wh. 250 v. DC 1200 rpm. 220/440/3/60 Ind.
75 kw. West. 500 v. DC 1200 rpm. 220/440/3/60/80% P.F.
30 kw. West. 60 v. 1750 rpm. dir. con. 220/440/3/60/Ind.

SHAKER SCREEN
La Del Shaker Screen 62¼" wide, 8' long.

SLIP RING MOTORS
3 ph. 60 cy.

HP.	Make	Speed	Type
700	G.E.	393	MT-432
400	West.	1170	CW
400	West	435	CW
300	G.E.	600	IM
260	Burke	600	EM-65
200	West.	690	CW-956A
100	West.	1750	

A.C. GENERATOR—3 ph. 60 cy.
219 kva G.E. 2200/440/220 v. 200 rpm.

A. C. Motors—3 ph. 60 cy.

HP.	Volts	Make	Type	Speed
150	220/440	West.	CS	1800
150	2300	West.	Syn.	900
200	2200/440/220	West.	CS	250
200	2200	G.E.	IK-15	1200
200	220/440	West.	Cr	720
200	220/440	West.	CS	600
225	2200	West.	CS	900
250	550/440/220	G. E.	I	600
250	220/440	West.	CS	900
250	2200	West.	CS	1200
275	2200	West.	CS	1800
300	220/440	West.	CS	1150
300	2300	West.	CS	1200
300	2200/440/220	West.	CS	450
350	2200/440/220	West.	CS	450
400	2200/440/220	West.	CS	500
450	2200/440/220	West.	CS	600
500	2200/440/220	West.	CS	720
600	2200/440/220	West.	CS	900

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25 HP. Thomas 18" face 20" dia.
40 H.P. single drum AC 220/3/60.
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4x3 Harris, 320 rpm.
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6x6 Gould, bronze, 1300 gpm.
8x8 Weinman, bronze.
5x6 Hayton, 750 gpm.
6x6 Manistee, 750 gpm.
6x6 American, 1000 gpm., bronze.
6x8 Weinman, 1000 gpm.

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50 kw. 250 V. D.C. Generator direct connected to International Diesel Engine.
50 kw. West. 220/3/60 Ames STEAM.
75 kw. G.E. 220/3/60 Bessemer GAS.
75 kva. Allis Chal. 220/3/60 dir. con. 14x14 Steam Engine.
80 kw. West. 250 V. Belted 110 Bessemer GAS.
175 kw. G.E. 2200/3/60 Ridgway STEAM.
225 kw. Elec. Machy. 2300/3/60 Ideal STEAM.

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1—Kerr Steam Turbine 450 BHP 3800 rpm., 5" intake 12" exhaust with Kerr Reduction Unit 3800 to 720 rpm., 115# pressure.
1—1000 kw. G.E. Turbo 6600/3/60 150# Pres.

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500 KW WEST. SYN. 275 V., 6 Ph., 60 Cy., 1200 RPM, Pedestal type, 2300/4000 V. Transformers.
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300 KW G.E. SYN. 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
200 KW AL-CH SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
150 KW R.W. SYN. 275 V., 6 Ph., 60 Cy., 1200 RPM, Pedestal type, 440/2300/4000 V. Trans.

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300 KW G.E. SYN. 275 V. 2300/4000 V. 3 Ph. 60 Cy. 80% P.F. 1200 RPM. Manual Switchgear
300 KW G.E. SYN 600 V. 2300/4000 V. 3 Ph. 60 Cy. 80% P.F. 1200 RPM. Manual Switchgear
200 KW G.E. IND., 275 V., 440 V., 3 Ph., 60 Cy., 720 RPM, Manual Switchgear.
200 KW G.E. SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 80% P.F., 1200 RPM. Manual Switchgear
200 KW G.E. SYN., 275 V., 2300 V., 3 Ph., 60 Cy., 100% P.F., 720 RPM, Manual Switchgear.
200 KW G.E. SYN. 600 V. 2300/4000 V. 3 Ph. 60 Cy. 80% P.F. 1200 RPM. Manual Switchgear
100 KW WEST. SYN. 275 V., 2300 V., 3 Ph., 60 Cy., 100% P.F. 900 RPM. Manual Switchgear.

LOCOMOTIVES

13-T JEFFREY, 250 V., MH-110 Mts., 44"-36" Ga.
10-Ton GOODMAN, 250 V., 29-A Mts., 36" Ga.
10-Ton GOODMAN, 500 V., 36-B Mts., 42" Ga.
8-Ton WESTGHE, 250 V., 906 Mts., 48"-36" Ga.
6-Ton WESTGHE, 250 V., 904-C Mts., 42"-36" Ga.
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6 ton 803, 44", as is 4 ton 1022, 44, as is
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36"—48" and 60" with adjustable pitch blades, up to 8400 CFM Free air.

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Jeffrey, 35B, 29B, and 4—28A 250 V. 2—29C with drop bar support.
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2—Permissible Type 12CA.

Sullivan, CE7, CE9, CE10, CR10 Low Vein 1 Class 5 Buddy and Shearing Machine. AC and DC.

SUBSTATIONS—275 volts, D.C.

1—200 KW **West.** Converters.
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1—150 KW **G.E.** Rotary.
1—150 KW **West.** Rotary.
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1—150 KW **West.** M-G Sets.
1—200 KW **G.E.** Rotary Converter.

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Locomotive, 40 ton, American, standard gauge, 4 wheel, saddle tank, steam brakes, electric lights. For sale or rent.

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1—36" x 804 ft., 6 ply, Belt Conveyor, heavy duty belt, roller bearing troughing and return idlers, complete with motor and James speed reducer. A complete modern unit in condition like new.

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Immediate shipment.

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SYN. MOTORS 3 ph. 60 cy.

HP	Make	V.	Speed
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2— 75	Westgh.	2200	900
75	Westgh.	220	1800

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150 KW West. 550 v. DC 2200 v. AC—1200 RPM
150 KW Ridgway 250 V.—2300 V. AC 900 RPM
100 KW Cr. Wh. 2502 DC—440/3/60 1200 RPM.
100 KW Westgh 250 v.—DC 2200 v. AC 1200 RPM.
75 KW West. 250 v.—2300/3/60 900 RPM
90 KW Al. Ch. 250 v. 2200 v. AC 900 RPM

LOCOMOTIVES

4 Ton Ironton 36" Ga. Type D with 36 cells 19 plate Exide Battery.
5½ Ton Type D Ironton 36" Ga. with 48 cell 21 plate Exide Battery.
Charging M.G. Set & Panel for each loco.
5 Ton Jeffrey Storage Battery 42 to 44" Ga. 2 BB motors. Battery box on top.
6 Ton Whitcomb 250 v. 40" Ga.
5 Ton Atlas Storage Battery—44" Ga.
8 Ton Jeffrey 250 v. 42" Ga. MH 100 Motors
10 Ton West. 250 v. 42" Ga.

MINING MACHINES

35 B Jeffrey 250 v. 36" Ga. #18972, 6' bar.
35 B Jeffrey 250 v. 36" Ga. truck 6' bar #11,416.
2—CE 7 Sullivan DC standard 30 HP
1—12 G3 Goodman Std. Truck 220/3/60 6' bar.

SLIP RING & SQ. CG. MOTORS (3 ph. 60 cy.)

HP	Make	Speed	Wdg.	Type
700	G.E.	393	S.R.	MT 432
400	West.	500	S.C.	CS
300	G.E.	600	S.R.	IM
250	G.E.	600	S.R.	I-L
200	Cr. Wh.	440	S.R.	28
200	G.E.	600	S.R.	I-L
200	Al. Ch.	600	S.C.	
150	G.E.	600	S.R.	I-L
125	G.E.	600	S.R.	I-L
125	Al. Ch.	435	S.R.	
125	Burke	1200	S.C.	
100	F.M.	600	S.C.	BB
100	Burke	900	S.C.	
100	GE	500	S.R.	MI-25 cy.
75	West.	870	S.R.	CW752C
75	West.	575	S.R.	CW868A
75	G.E.	865	S.C.	KT

HOISTS

75 HP Ottumwas sgl. fr. drum 36" Dia. 30" wide 8" flanges geared 75 HP CI Westgh. slip ring motor with rev. drum control
75 HP Lidgerwood sgl fr. drum
50 HP Diamond 2 drums same Shaft
30 HP Clyde sgl. drum AC Motor
25 HP Thomas sgl. drum AC Motor
15 HP Lidgerwood sgl. dr. AC Motor Pumps

400 TRANSFORMERS (Westgh. & GE 1 ph.)

Qu.	KVA	Pri. V.	Sec. V
3	1	2080/2200	115/230
5	2	"	"
100	5	"	"
137	7½	"	"
71	10	"	"
10	15	"	"
25	25	"	"
1	30	"	"
3	37 Rotary	4400/185	"
6	50	2080/2200	"
2	100	"	"
		3 Phase	
1	150	"	230/460

ENGINE GENERATOR SETS

100 KW 250 v. DC Westgh.—Skinner Engine

AIR COMPRESSORS

550 cu. ft. 100# Bury 2 stage
2—505 cu.ft. 55# Sullivan 14 x 10
2—355 cu.ft. 100# Chg.Pn. 12 x 10
160 cu. ft. Chic. Pneu. 100#

D. C. MOTORS

1 to 125 HP, all speeds

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CONVEYOR BELTING
ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"
42"	5	1/8"	1/16"
36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

TRANSMISSION BELTING
HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

ELEVATOR BELTING
HEAVY DUTY RUBBER COVERED

Width	Ply	Top-Bottom	Covers
12"	6	1/16"	1/16"
14"	6	1/16"	1/16"
16"	6	1/16"	1/16"
18"	6	1/16"	1/16"

ENDLESS "V" BELTS

"A" — WIDTH — All Sizes
"B" — WIDTH — All Sizes
"C" — WIDTH — All Sizes
"D" — WIDTH — All Sizes
"E" — WIDTH — All Sizes
Sold in Matched Sets

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1—200 KW West. Rotary Converter, 275 V DC with 2300 V transformers.
1—35 KW 125 V Battery Charging Set.

MINE LOCOMOTIVES

2—8 ton Jeffrey MH 100 250 V motors.
1—8 ton West. Bar Steel Frame, 906 motors.
1—6 ton Jeffrey MH 88 250 V motors.
1—6 ton G. E. with 250 V motors.
2—5 ton G. E. HM 825 motors Gathering.

CUTTING MACHINES

8—35B Jeffrey 250 V Shortwall.
1—35BB Jeffrey AC Shortwall.
1—12G3 Goodman AC Shortwall.
2—12AB Goodman 210 V DC Shortwall.
1—29B Jeffrey Arcwall DC.
1—29C Jeffrey Arcwall DC.
1—29 LE Jeffrey with turn over head AC motors.

MOTORS

1—600 HP West. Type CW Slip Ring, 3/60/2300/435 RPM.

MISCELLANEOUS

2—G-15 Goodman duck bill Conveyor Loaders.
1—90-L Elevating Conveyor.

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GANTRY TYPE • CAPACITY 750 T.P.H.
RAIL SPAN 44' • OVERALL HEIGHT 114' WIDTH 166'
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1—124-EJ Goodman Slabber
1—29-C Jeffrey Arcwall
1—12-A Goodman Shortwall
1—12-AA Goodman Shortwall
8—CE-7 Sullivan Shortwall
1—CE-10 Sullivan Shortwall
1—CR-2 Sullivan low vein
2—CE-7 Sullivan 220 Volt AC
1—35-B Jeffrey with low vein truck

LOADING MACHINES

1—8-BU Joy, practically new, 250 volt
1—8-BU Joy, 550 volt
1—44-DD Jeffrey, 250 volt

LOCOMOTIVES

1—6-Ton Ironton with G.E. Reel—26" high over all.

MISCELLANEOUS

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1—150-KW M-G Set, 500 volt
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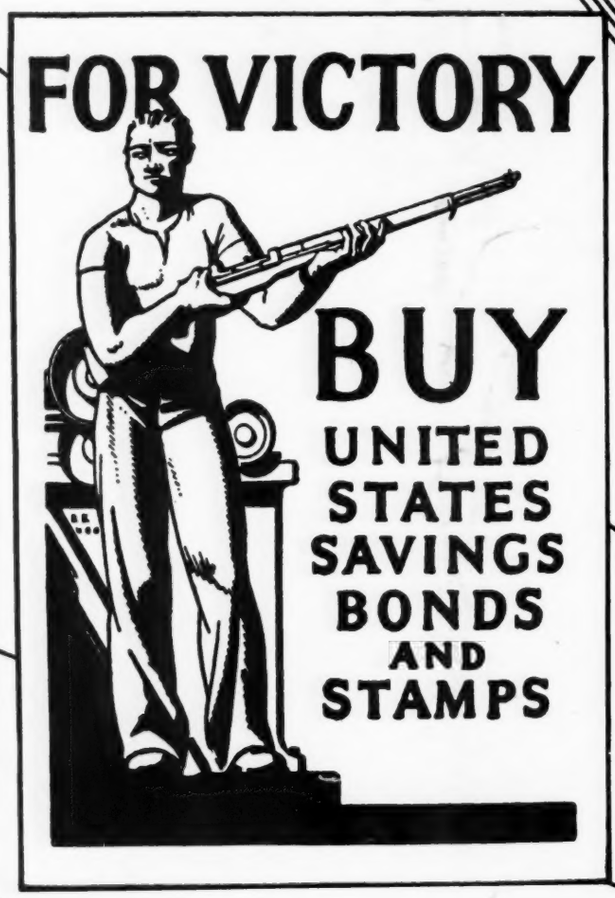

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